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BOMBAY BRANCH

OF THE

Royal Asiatic Society.

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YEAR-BOOK

OF THE

ROYAL SOCIETY OF LONDON.

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1900.

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LONDON:
HARRISON AND SONS, ST. MARTIN'S LANE,
Printers in Ordinary to Her Majesty.
1900.

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HARRISON AND SONS,
PRINTERS IN ORDINARY TO HER MAJESTY,
ST. MARTIN'S LANE.

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YEAR-BOOK

OF

THE ROYAL SOCIETY.

1900.

FIXTURES OF THE SOCIETY.

1900.

JANUARY	18.	*Ordinary Meeting* at 4.30 P.M.
,,	25.	,, ,, ,,
,,	31.	*Last day for receiving applications for Government Grants.*
FEBRUARY	1.	*Ordinary Meeting* at 4.30 P.M.
,,	8.	,, ,, ,,
,,	15.	,, ,, ,,
,,	22.	,, ,, ,,
MARCH	1.	,, ,, ,,
		Last day for receiving certificates of Candidates for election.
,,	8.	*Ordinary Meeting* at 4.30 P.M.
,,	15.	,, ,, ,,
,,	22.	,, ,, ,,
,,	29.	,, ,, ,,
APRIL	5.	,, ,, ,,
MAY	10.	,, ,, ,,
,,	17.	,, ,, ,,
,,	31.	,, ,, ,,
JUNE	14.	*Election of Fellows* at 4 P.M.
,,	21.	*Ordinary Meeting* at 4.30 P.M.
NOVEMBER	15.	,, ,, ,,
,,	22.	,, ,, ,,
,,	30.	*Anniversary Meeting* at 4 P.M.
DECEMBER	6.	*Ordinary Meeting* at 4.30 P.M.
,,	13.	,, ,, ,,

THE LIST OF THE ROYAL SOCIETY, JAN. 1, 1900.

HER SACRED MAJESTY QUEEN VICTORIA, PATRON.

Date of Election.	
1863. Feb. 12.	HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.
1882. Mar. 16.	HIS ROYAL HIGHNESS THE DUKE OF SAXE-COBURG AND GOTHA, K.G.
1893. June 8.	HIS ROYAL HIGHNESS THE DUKE OF YORK, K.G.

THE COUNCIL.

THE LORD LISTER, F.R.C.S., D.C.L., LL.D—PRESIDENT.
ALFRED BRAY KEMPE, M.A.—TREASURER and VICE-PRESIDENT.
PROF. SIR MICHAEL FOSTER, K.C.B., M.A., M.D., D.C.L., LL.D.—SECRETARY.
PROF. ARTHUR WILLIAM RÜCKER, M.A., D.Sc.—SECRETARY.
THOMAS EDWARD THORPE, Sc.D., LL.D.—FOREIGN SECRETARY.

HORACE T. BROWN, F.C.S.
JAMES BRYCE, D.C.L.
CAPTAIN ETTRICK WILLIAM CREAK, R.N.
PROF. JAMES DEWAR, M.A.—VICE-PRESIDENT.
PROF. EDWIN BAILEY ELLIOTT, M.A.
HANS FRIEDRICH GADOW, Ph.D.
PROF. WILLIAM DOBINSON HALLIBURTON, M.D.
PROF. WILLIAM ABBOTT HERDMAN, D.Sc.
SIR ANDREW NOBLE, K.C.B.—VICE-PRESIDENT.
PROF. ARNOLD WILLIAM REINOLD, M.A.
GEORGE JOHNSTONE STONEY, D.Sc.—VICE-PRESIDENT.
GEORGE JAMES SYMONS, F.R.Met.Soc.
J. J. H. TEALL, M.A.
PROF. JOSEPH JOHN THOMSON, M.A.
PROF. EDWARD BURNETT TYLOR, D.C.L.
SIR SAMUEL WILKS, Bart., M.D.

*** *This Council will continue till November* 30, 1900.

Assistant-Secretary and Librarian.
ROBERT W. F. HARRISON.

Clerk.
THEODORE E. JAMES.

Assistant Librarian.
A. HASTINGS WHITE.

Papers Clerk—RICHARD CHAPMAN.

GOVERNMENT GRANT.
Clerk to the Committee—THE ASSISTANT SECRETARY.
Assistant ditto—FRANCIS A. TOWLE.

FELLOWS OF THE SOCIETY.

Abbreviated from the Official List of Fellows, and Corrected up to January 1, 1900.

(C) prefixed to a name indicates the award of the Copley Medal.
(R) " " " " " Royal Medal.
(Rm) " " " " " Rumford Medal.
(D) " " " " " Davy Medal.
(DW) " " " " " Darwin Medal.
(B) " " " " " Buchanan Medal.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 7, 1860.	'67–69 '77–79	V.P. '77–78	R.	Abel, Sir Frederick Augustus, Bart., K.C.B., D.C.L. (Oxon.), D.Sc. (Camb.). 2, *Whitehall-court*, S.W.; *and Imperial Institute, Imperial Institute-road*, S.W.
June 1, 1876.	'83–85 '91–93		Rm.	Abney, Sir William de Wiveleslie, Capt. R.E., K.C.B., D.C.L. (Dunelm.), Principal Assistant Secretary of the Science and Art Department. *Rathmore Lodge, Bolton-gardens South, Earl's Court*, S.W.; *and Athenæum Club*, S.W.
Jan. 21, 1847.	'58–59			Acland, Sir Henry Wentworth Dyke, Bart., K.C.B., M.D., LL.D. (Cantab.), Radcliffe Librarian and late Reg. Prof. of Medicine in the University of Oxford. *Broad-street, Oxford.*
June 6, 1872.	'82–84 '96–98			Adams, William Grylls, M.A., D.Sc., Professor of Natural Philosophy and Astronomy in King's College, London. 43, *Campden-hill-square*, W.
June 6, 1889.				Aitken, John, F.R.S.E. *Ardenlea, Falkirk*, N.B.
June 3, 1880.	'96–98			Allbutt, Thomas Clifford, M.A., M.D., Regius Professor of Physic in the University of Cambridge. *St. Radegund's, Cambridge.*
June 12, 1884.				Allman, George Johnston, LL.D. (Dubl.), D.Sc., Emeritus Professor of Mathematics in Queen's College, Galway. *St. Mary's, Galway.*
June 12, 1879.				Anderson, John, M.D., LL.D. (Edin.), late Superintendent, Indian Museum, and Professor of Comparative Anatomy in the Medical College, Calcutta. 71, *Harrington-gardens*, S.W.
June 7, 1888.				Andrews, Thomas, Mem. Inst. C.E. *Ravencrag, Wortley, near Sheffield.*
June 19, 1851.	'55–56 '83–84	V.P. '83–84		Argyll, George Douglas Campbell, Duke of, K.G., K.T., D.C.L. (Oxon.), LL.D. (Camb.). *Argyll Lodge, Kensington*, W.; *and Inverary Castle, Argyleshire.*
June 1, 1876.	'88–90			Armstrong, Henry Edward, Ph.D. (Lips.), LL.D. (St. Andr.), Professor of Chemistry at the City

Date of Election.	Member of Council.	Held Office.	Medals.	
				and Guilds of London Central Institute. 55, *Granville-park, Lewisham*, S.E.; *and Athenæum Club*, S.W.
May 7, 1846.	'61-62			Armstrong, William George, Lord, C.B., D.C.L. (Oxon.), LL.D. (Cantab.). *Athenæum Club; Cragside, Rothbury; and Newcastle-upon-Tyne.*
June 3, 1880.				Attfield, John, M.A., Ph.D. (Tüb.), Late Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain. *Ashlands, Watford; and* 111, *Temple Chambers*, E.C.
June 2, 1881.	'89-91			Ayrton, William Edward, Professor of Electrical Engineering in the Central Technical College of the City and Guilds of London Institute. *Exhibition-road*, S.W.; *and* 41, *Kensington Park-gardens*, W.
June 4, 1885.				Baird, Andrew Wilson, Colonel, R.E., C.S.I. *Palmerscross, Elgin, N.B.; and East India United Service Club*, S.W.
June 5, 1890.	'92-93			Baker, Sir Benjamin, K.C.M.G., LL.D. 2, *Queen-square-place, Queen Anne's Mansions, Westminster; and Athenæum Club*, S.W.
June 9, 1898.				Baker, Henry Frederick, M.A., University Lecturer in Mathematics, Cambridge. 4, *Belvoir-terrace, Trumpington-road, Cambridge.*
June 6, 1878.	'83-84			Baker, John Gilbert, F.L.S. Late Keeper of the Herbarium, Royal Gardens, Kew. 3, *Cumberland-road, Kew.*
Jan. 12, 1888.				Balfour, Right. Hon. Arthur James, D.C.L. 10, *Downing-street*, S.W.; *and Whittinghame, Prestonkirk*, N.B.
June 12, 1884.	'92-94			Balfour, Isaac Bayley, D.Sc., M.D. (Edin.), Keeper of the Royal Botanic Garden, Edinburgh, Queen's Botanist in Scotland, and Professor of Botany in the University of Edinburgh. *Inverleith House, Edinburgh; and Athenæum Club*, S.W.
June 12, 1873.	'97-98			Ball, Sir Robert Stawell, Kt., Hon., M.A. (Cantab.), LL.D., Pres.R.A.S., Lowndean Professor of Astronomy and Geometry in the University of Cambridge. *The Observatory, Cambridge; and Athenæum Club*, S.W.
June 6, 1850.	'80-81	V.P. '80-81		Barlow, William Henry, F.R.S.E. *High Combe, Old Charlton, Kent.*
June 1, 1899.				Barrett, William F., M.R.I.A., Professor of Experimental Physics in the Royal College of Science for Ireland. 6, *De Vesci Terrace, Kingston, co. Dublin.*

Date of Election.	Member of Council.	Held Office.	Medals.	
				Barry (*see* Wolfe Barry).
June 6, 1889.				Basset, Alfred Barnard, M.A. *Fieldborough Hall, Holyport, Berks.*
June 4, 1868.				Bastian, Henry Charlton, M.A., M.D., Professor of the Principles and Practice of Medicine, University College, Physician to University College Hospital. 8A, *Manchester-square*, W.
June 7, 1894.				Bateson, William, M.A. (Cantab.), *Merton House, Grantchester, Cambridge.*
June 11, 1857.	'65–67			Beale, Lionel Smith, M.B., late Prof. of the Principles and Practice of Medicine in King's College, London, and Government Medical Referee for England. 61, *Grosvenor-street*, W.
June 2, 1892.				Beddard, Frank Evers, M.A. (Oxon.), Lecturer on Comparative Anatomy, Guy's Hospital, Prosector to the Zoological Society. *Zoological Society's Gardens, Regent's Park*, N.W.
June 12, 1873.				Beddoe, John, M.D., LL.D. (Edin.). *The Chantry, Bradford-on-Avon; and Athenæum Club*, S.W.
June 4, 1874.	'81–82			Bell, Sir Lowthian, Bart., M. Inst. C.E. *Rounton Grange, by Northallerton.*
June 12, 1884.				Bell, James, C.B., D.Sc. (Dubl.), late Principal of the Inland Revenue Laboratory, Somerset House. *Howell Hill Lodge, Ewell, Surrey.*
June 3, 1897.				Bell, Robert, M.D., B.A.Sc., LL.D., Assistant Director of the Geological Survey of Canada. *Sussex-street, Ottawa, Canada.*
June 8, 1871.				Besant, William Henry, D.Sc., Fellow of St. John's College, Cambridge. *St. John's College, and Spring Lawn, Harvey-road, Cambridge.*
June 4, 1886.				Bidwell, Shelford, M.A., LL.B. *Riverstone Lodge, Southfields, Wandsworth*, S.W.
June 4, 1874.	'91–93	V.P. '92–93		Blanford, William Thomas, LL.D. (Univ. McGill). 72, *Bedford-gardens, Campden-hill, Kensington*, W.
June 6, 1878.	'80–82 '95 '97–99	V.P. '98–99		Bonney, Rev. Thomas George, D.Sc., LL.D. (Univ. McGill), Professor of Geology in University College, London. 23, *Denning-road, Hampstead*, N.W.
June 1, 1899.				Booth, Charles, Hon. Sc.D. (Camb.). 24, *Great Cumberland-place*, W.
June 5, 1890.				Bosanquet, Robert Holford Macdowall, M.A., Fellow of St. John's College, Oxford. *Castillo Zamora, Realejo-Alto, Teneriffe.*
June 7, 1888.				Bottomley, James Thomson, M.A., D.Sc., Lecturer on Natural Philosophy in the University of Glasgow. 13, *University-gardens, Glasgow.*
June 7, 1894.				Boulenger, George Albert, F.Z.S. 8, *Courtfield-road, South Kensington*, S.W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 13, 1895.				Bourne, Alfred Gibbs, D.Sc., Professor of Biology in the Presidency College, Madras. *Presidency College, Madras.*
June 4, 1891.				Bower, Frederick Orpen, D.Sc. (Camb.), Regius Professor of Botany in the University of Glasgow. 45, *Kerrsland-terrace, Hillhead, Glasgow.*
June 7, 1888.			R.	Boys, Charles Vernon, A.R.M.S. 27, *The Grove, Boltons,* S.W.
June 7, 1894.				Bradford, John Rose, M.D., D.Sc., Physician to University College Hospital. 8, *Manchester-square,* W.
June 8, 1882.				Brady, George Stewardson, M.D., LL.D., Professor of Natural History in the Durham College of Science, Newcastle. 2, *Mowbray-villas, Sunderland.*
June, 12 1873.	'77–78			Bramwell, Sir Frederick Joseph, Bart., D.C.L., LL.D., M. Inst. C.E. 5, *Great George-street, Westminster,* S.W.
June 3, 1875.				Brandis, Sir Dietrich, K.C.I.E., Ph.D., LL.D., late Inspector-General of Forests to the Government of India. 21, *Kaiser Strasse, Bonn, Germany.*
June 3, 1897.				Broadbent, Sir William Henry, Bart., M.D. (Lond.), LL.D. (St. Andrew's), F.R.C.P., Physician Extraordinary to the Queen, Consulting Physician to St. Mary's Hospital, and to the London Fever Hospital. 84, *Brook-street,* W.
June 12, 1879.	'91–92			Brown, Alexander Crum, D.Sc., LL.D., Professor of Chemistry in the University of Edinburgh. 8, *Belgrave-crescent, Edinburgh.*
June 9, 1898.				Brown, Ernest William, M.A., Sc.D., Professor of Applied Mathematics in Haverford College. *Haverford College, Philadelphia, U.S.A.*
June 6, 1889.	'99–			Brown, Horace T., LL.D., F.C.S., F.I.C. 52, *Nevern-square, Kensington,* S.W.
June 7, 1883.				Browne, Sir James Crichton, Kt., M.D., LL.D. 61, *Carlisle-place Mansions, Victoria-street,* S.W.
June 1, 1899.				Bruce, David, M.B., Major R.A.M.C. *Pietermaritzburg, Natal.*
June 4, 1874.	'82–84			Brunton, Sir Thomas Lauder, M.D., Sc.D. (Edin.). 10, *Stratford-place, Oxford-street,* W.; *and Athenæum Club.*
June 13, 1895.				Bryan, George Hartley, Sc.D., Professor of Mathematics in the University College of North Wales. *Plas Gwyn, Bangor, N. Wales.*
Dec. 14, 1893.	'99–			Bryce, Right Hon. James, D.C.L. 54, *Portland-place,* W.
June 9, 1898.				Buchan, Alexander, M.A., LL.D. 42, *Heriot-row, Edinburgh.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 9, 1887.				Buchanan, John Young, M.A., F.R.S.E. 10, *Moray-place, Edinburgh.*
June 11, 1857.	'61–63			Buckton, George Bowdler, F.E.S., F.L.S. *Weycombe, Haslemere, Surrey.*
June 12, 1879.				Buller, Sir Walter Lawry, K.C.M.G., D.Sc. *The Terrace, Wellington, New Zealand.*
June 5, 1890.				Burbury, Samuel Hawksley, M.A. 17, *Upper Phillimore-gardens, Kensington,* W.
June 1, 1893.				Burnside, William, M.A., Professor of Mathematics, Royal Naval College, Greenwich. *The Laurels, Hithergreen-lane,* S.E.
June 7, 1894.				Callendar, Hugh Longbourne, M.A., Quain Professor of Physics in University College, London. *University College, Gower Street,* W.C.
June 8, 1871.	'77–79			Carruthers, William, F.L.S., F.G.S., Late Keeper of the Botanical Department, British Museum. 14, *Vermont-road, Norwood,* S.E.
June 9, 1887.				Cash, John Theodore, M.D., Regius Professor of Materia Medica in the University of Aberdeen. 9, *Albyn-place, Aberdeen.*
Dec. 14, 1882.				Chamberlain, Right. Hon. Joseph, D.C.L. (Oxon.), LL.D. (Cantab.). 40, *Prince's-gardens; and Athenæum Club,* S.W.
June 7, 1894.				Cheyne, William Watson, M.B., F.R.C.S., Professor of Surgery in King's College, London. 75, *Harley-street,* W.
June 3, 1897.				Chree, Chas., M.A., Sc.D., Superintendent of the Kew Observatory. *Kew Observatory, Richmond, Surrey.*
June 2, 1881.	'83–85 '89–91	V.P. '90–91		Christie, William Henry Mahoney, C.B., M.A., Astronomer Royal. *Royal Observatory, Greenwich,* S.E.
June 7, 1888.				Church, Arthur Herbert, M.A. (Oxon.), Professor of Chemistry in the Royal Academy of Arts, President of the Mineralogical Society. *Shelsley, Kew.*
June 7, 1888.			R.	Clarke, Alexander Ross, Colonel, R.E., C.B. *Boldrewood, Redhill, Surrey.*
June 8, 1882.	'88–90			Clarke, Charles Baron, M.A. (Cantab.). 13, *Kew Gardens-road, Kew.*
June 4, 1896.				Clarke, Lieut.-Colonel Sir George Sydenham, R.E., K.C.M.G. 13, *Gledhow-gardens,* S.W.
June 6, 1872.	'97–98			Cleland, John, M.D., D.Sc., LL.D., Professor of Anatomy in the University of Glasgow. *University, Glasgow.*
June 9, 1848.	'78–80			Clerk, Henry, Major-General, R.A. "*Mountfield,*" 5, *Upper Maze-hill, St. Leonard's-on-Sea.*
June 4, 1868.	'71–73 '85–87 '96–98	V.P. '96–98		Clifton, Robert Bellamy, M.A. (Cantab. et Oxon.), Professor of Experimental Philosophy in the

Date of Election.	Member of Council.	Held Office.	Medals.	
				University of Oxford. 3, *Bardwell-road, Banbury-road, Oxford; and Athenæum Club.*
June 4, 1896.				Collie, J. Norman, Ph.D. 16, *Campden-grove, Kensington,* W.
June 4, 1885.	'93–95			Common, Andrew Ainslie, LL.D. (St. And.), D.Sc. 63, *Eaton-rise, Ealing,* W.
June 4, 1891.				Conroy, Sir John, Bart., M.A., F.C.S., Fellow and Bedford Lecturer of Balliol College, Oxford. *Balliol College, Oxford.*
June 6, 1878.				Cotterill, James Henry, M.A., late Professor of Applied Mechanics, Royal Naval College, Greenwich. 15, *St. Alban's Mansions, Kensington Court Gardens,* W.
June 6, 1878.	'78–79			Crawford, James Ludovic, Earl of, K.T., LL.D. 2, *Cavendish-square,* W.; *and Haigh Hall, Wigan.*
June 4, 1885.	'98–			Creak, Ettrick William, Captain R.N. 9, *Hervey-road, Blackheath,* S.E.
June 4, 1868.				Crofton, Morgan William, D.Sc., Fellow of the Royal University of Ireland.
June 4, 1863.	'77–79 '94–96	V.P. '95–96	R. D.	Crookes, Sir William, 7, *Kensington-park-gardens,* W.; *and Athenæum Club,* S.W.
April 3, 1879.	'80–81			Cross, Right Hon. Richard Assheton, Viscount, G.C.B., D.C.L. 12, *Warwick-square and Athenæum Club,* S.W.; *and Eccle Riggs, Broughton-in-Furness, Lancashire.*
June 4, 1891.	'98–99			Cunningham, Daniel John, M.D., D.C.L., Prof. of Anatomy in the University of Dublin. 43, *Fitzwilliam-place, Dublin.*
June 6, 1889.				Cunningham, David Douglas, C.I.E., M.B., Brigade Surgeon Lieut.-Col. Bengal Medical Service; Late Professor of Physiology in the Medical College, Calcutta. *Torre Mount, Torquay.*
Dec. 15. 1898.				Curzon of Kedleston, George Nathaniel, Lord. *Government House, Calcutta.*
June 3, 1880.				Dallinger, Rev. William Henry, LL.D., Sc.D. (Dubl.). *Ingleside, Newstead-road, Lee,* S.E.
June 8, 1882.	'94–95			Darwin, Francis, M.A. and M.B. (Cantab.), Reader in Botany in the Univ. of Cambridge. *Wychfield, Huntingdon-road, Cambridge.*
June 12, 1879.	'84–85 '86–87		R.	Darwin, George Howard, M.A., LL.D. (Glasc.), Plumian Professor of Astronomy and Experimental Philosophy in the University of Cambridge. *Newnham Grange, Cambridge.*
Jan. 24, 1895.				Davey, Right Hon. Horace, Lord, M.A., D.C.L. 86, *Brook-street,* W.; *and Verdley-place, Fernhurst, Sussex.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 6, 1867.	'89–91			Dawkins, W. Boyd, M.A. (Oxon.), Professor of Geology and Palæontology in the Victoria University, Manchester. *Woodhurst, Faliowfield, Manchester.*
June 4, 1891.				Dawson, George Mercer, C.M.G., LL.D., Director of the Geological Survey of Canada. *Sussex-street, Ottawa, Canada.*
June 6, 1861.	'70–72 '81–83			Debus, Heinrich, Ph.D., Lecturer on Chemistry at Guy's Hospital. 4, *Schlangenweg, Cassel, Hessen, Germany.*
Mar. 3, 1892.				Devonshire, Spencer Compton Cavendish, Duke of, K.G., M.A., LL.D., Chancellor of the University of Cambridge. *Devonshire House, Piccadilly, W.; and Chatsworth, Derbyshire.*
June 7, 1877.	'85–86 '98–	V.P. '99–	Rm.	Dewar, James, M.A., LL.D., Pres.C.S., Jacksonian Prof. of Natural Experimental Philosophy in the University of Cambridge, Fullerian Prof. of Chemistry in the Royal Institution. 1, *Scroope-terrace, Cambridge; and Royal Institution, Albemarle-street, W.*
June 4, 1885.				Divers, Edward, M.D., Emeritus Professor of Chemistry in the Imperial University, Japan. 34, *St. Mary Abbot's terrace, Kensington, W.*
June 4, 1886.				Dixon, Harold B., M.A., F.C.S., Professor of Chemistry and Director of the Chemical Laboratories in Owens College, Manchester. *Owens College, Manchester.*
June 4, 1896.				Downing, Arthur Matthew Weld, D.Sc. 74, *Vanbrugh-park, Blackheath, S.E.*
Feb. 22, 1855.				Ducie, Henry John Reynolds-Moreton, Earl of, F.G.S. *Tortworth Court, Falfield, Gloucestershire.*
Feb. 9, 1865.				Dufferin and Ava, Frederick Temple Blackwood, Marquis of, K.P., G.C.B., D.C.L. *Clandeboye, Co. Down, Ireland.*
June 1, 1893.				Dunstan, Wyndham R., M.A., F.I.C., Director of the Department of Scientific and Technical Research of the Imperial Institute. *Queen Anne's Mansions, St. James's Park, S.W.*
June 3, 1875.				Dupré, August, Ph.D., F.C.S., Lecturer on Chemistry at the Westminster Hospital. 2, *Edinburgh Mansions, Howick-place, S.W.*; and *Mount Edgcumbe, Benhill-road, Sutton, Surrey.*
				Dyer (*see* Thiselton-Dyer).
June 4, 1895.				Elgar, Francis, LL.D. 18, *York-terrace, Regent's-park, N.W.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 13, 1895.				Eliot, John, C.I.E., M.A., Meteorological Reporter to the Government of India. *Indian Meteorological Office, Simla.*
June 12, 1873.				Ellery, Robert Lewis John, C.M.G., F.R.A.S., late Government Astronomer, and Director of the Observatory. *Melbourne, Victoria.*
June 4, 1891.	'99–			Elliott, Edwin Bailey, M.A., F.R.A.S., Waynflete Professor of Pure Mathematics in the University of Oxford. 4, *Bardwell-road, Oxford.*
June 1, 1893.				Ellis, William, F.R.A.S., late Superintendent of the Magnetical and Meteorological Department, Royal Observatory, Greenwich. 12, *Vanbrugh-hill, Blackheath*, S.E.
June 3, 1897.				Elwes, Henry John, F.L.S., F.Z.S. *Colesborne Park, Andoversford, Gloucestershire.*
June 3, 1869.				Esson, William, M.A., F.C.S., F.R.A.S., Savilian Professor of Geometry in the University of Oxford. *Merton College; and* 13, *Bradmore-road, Oxford.*
June 8, 1871.	'84–85	V.P. '74-75		Etheridge, Robert, F.R.S.E., F.G.S. 14, *Carlyle-square, Chelsea*, S.W.
June 2, 1864.	'67–68 '73–75 '78–98	TREAS. '78–98		Evans, Sir John, K.C.B., D.C.L., LL.D. *Nash Mills, Hemel Hempstead; and Athenæum Club.*
June 12, 1879.				Everett, Joseph David, M.A., D.C.L., Professor of Natural Philosophy in Queen's College, Belfast. 11, *Leopold-road, Ealing*, W.
June 1, 1893.				Ewart, James Cossar, M.D., Professor of Natural History in the University of Edinburgh. *The University, Edinburgh.*
June 9, 1887.	'96–98		R.	Ewing, James Alfred, Hon. M.A. (Camb.), B.Sc. (Edin.), Professor of Mechanism and Applied Mechanics in the University of Cambridge. *Langdale Lodge, Cambridge.*
June 7, 1866.				Farrar, Very Rev. Frederic William, M.A., D.D., Dean of Canterbury. *The Deanery, Canterbury.*
June 7, 1877.	'95–96			Fayrer, Sir Joseph, Bart., K.C.S.I., M.D., LL.D., Honorary Physician to the Queen. 16, *Devonshire-street, Portland-place*, W.
June 1, 1899.				Fenton, Henry John Horstman, M.A. (Camb.). 7, *Mortimer-road, Cambridge.*
June 7, 1877.				Ferrers, Rev. Norman Macleod, D.D., Master of Gonville and Caius College, Cambridge. *The Lodge, Gonville and Caius College, Cambridge.*
June 1, 1876.	'86–88		R.	Ferrier, David, M.D., F.R.C.P., Professor of Neuropathology, King's College, London. 34, *Cavendish-square*, W.; *and Athenæum Club*, S.W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 4, 1886.				Festing, Edward Robert, Major-General, R.E. (retired), C.B., Science Museum Director, Victoria and Albert Museum. 30, *Queen's Gate-terrace*, S.W.
June 7, 1883.			R.	Fitzgerald, Prof. George Francis, M.A., D.Sc. 40, *Trinity College, Dublin.*
June 2, 1892.				Fleming, John Ambrose, M.A. (Camb.), D.Sc. (Lond.), Fellow and Professor of Electrical Engineering in University College, London. *University College, Gower-street*, W.C.; *and* 2, *Langland-place, Finchley-road, Hampstead*, N.W.
June 6, 1889.	'95–96 '96–97			Fletcher, Lazarus, M.A. (Oxon.), F.G.S., Keeper of Minerals in the British Museum. *Natural History Museum, Cromwell-road; and* 36, *Woodville-road, Ealing*, W.
June 9, 1887.				Forbes, George, M.A., Mem. Inst. C.E., formerly Professor of Nat. Phil. in Anderson's College, Glasgow. 34, *Great George-street*, S.W.
June 4, 1886.	'93–95		R.	Forsyth, Andrew Russell, M.A., Sc.D., Sadlerian Professor of Pure Mathematics in the University of Cambridge. *Trinity College, Cambridge.*
June 2, 1892.				Foster, Clement Le Neve, B.A., D.Sc. (Lond.), Professor of Mining in the Royal College of Science, and H.M. Inspector of Mines. *Min-y-don, Llandudno.*
June 3, 1869.	'70–72 '77–78 '83–85 91–93	V.P. '91–93		Foster, George Carey, B.A., late Professor of Physics in University College, London. *Lady-walk, Rickmansworth, Herts; and Athenæum Club*, S.W.
June 6, 1872.	'76–77 '81–	SEC. '81–		Foster, Sir Michael, K.C.B., M.D., D.C.L., LL.D., Professor of Physiology in the University of Cambridge. *Great Shelford, Cambridge.*
June 4, 1891.				Frankland, Percy Faraday, Ph.D., B.Sc., Professor of Chemistry in the Mason College, Birmingham. *Mason College, Birmingham.*
June 7, 1877.				Fraser, Thomas Richard, M.D., F.R.C.P. (Edin.), Professor of Materia Medica and Clinical Medicine in the University, Edinburgh. 13, *Drumsheugh-gardens, Edinburgh.*
June 7, 1894.				Froude, Robert Edmund, Superintendent of the Admiralty Experimental Works, Gosport. *North Lodge, Alverstoke, Gosport.*
Dec. 13, 1883.				Fry, Right Hon. Sir Edward, D.C.L., LL.D. *Failand House, Failand, near Bristol.*
June 2, 1892.	'99–			Gadow, Hans Friedrich, Ph.D., M.A., Strickland Curator and Lecturer on the Advanced Morpho-

Date of Election.	Member of Council.	Held Office.	Medals.	
				logy of Vertebrata in the University of Cambridge. *Zoological Laboratory, Cambridge.*
June 1, 1893.				Gairdner, Sir William Tennant, K.C.B., M.D., LL.D., Professor of Medicine in the University of Glasgow. *The University, Glasgow.*
June 7, 1860.	'65–66 '70–72 '76–77 '82–84	V.P. '70–72 '76–77 '83–84	R.	Galton, Francis, M.A., D.C.L. 42, *Rutland-gate*, S.W.
June 1, 1899.				Gamble, James Sykes, C.I.E., M.A. (Oxon), F.L.S. *Highfield, East Liss, Hants.*
June 6, 1872.	'86–88			Gamgee, Arthur, M.D., F.R.C.P., Emeritus Professor of Physiology in Owens College, Victoria University. 5, *Avenue du Kursaal, Montreux, Switzerland.*
June 5, 1890.			R.	Gardiner, Walter, M.A., F.L.S., University Lecturer in Botany at Cambridge. 45, *Hill's-road, Cambridge.*
June 3, 1858.				Garrod, Sir Alfred Baring, M.D., Consulting Physician to King's College Hospital, Physician Extraordinary to the Queen. 10, *Harley-street*, W.
June 8, 1882.	'95–97		R.	Gaskell, Walter Holbrook, M.A., M.D., Lecturer in Physiology at Cambridge. *The Uplands, Great Shelford, near Cambridge.*
June 1, 1865.	'85–87 '89–93	FOR. SEC. '89–93 V.P. '85–87	R.	Geikie, Sir Archibald, Knt., Sc.D., LL.D., Director-General of the Geological Survey of the United Kingdom, and of the Museum of Practical Geology, London. *Geological Survey Office*, 28, *Jermyn-street*, S.W.; 10, *Chester-terrace, Regent's Park*, N.W.
June 3, 1875.				Geikie, James, D.C.L., LL.D., Murchison Professor of Geology and Mineralogy in the University of Edinburgh. *Kilmorie, Colinton-road, Edinburgh.*
June 2, 1892.				Giffen, Sir Robert, K.C.B., LL.D. (Glasc.). 9, *Bina Gardens, South Kensington*, S.W.
June 7, 1860.	'86–88		R.	Gilbert, Sir Joseph Henry, M.A., Sc.D., late Sib. thorpian Professor of Rural Economy in the Univ. of Oxford. *Harpenden, St. Alban's; and Athenæum Club.*
June 4, 1891.				Gilchrist, Percy Carlyle, A.R.S.M. *Frognal Bank, Finchley-road, Hampstead*, N.W.
June 7, 1883.				Gill, David, C.B., LL.D., Her Majesty's Astronomer at the Cape of Good Hope. *Royal Observatory, Cape of Good Hope.*
June 2, 1853.	'63–64 '66–68		D.	Gladstone, John Hall, Ph.D., Sc.D. 17, *Pembridge-square*, W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 7, 1849.				Glaisher, James, F.R.A.S. *The Shola, Heathfield-road, South Croydon.*
June 3, 1875.	'83–84 '90–92			Glaisher, James Whitbread Lee, Sc.D. *Trinity College, Cambridge.*
June 8, 1882.	'92–94			Glazebrook, Richard Tetley, M.A., Director of the National Physical Laboratory. 23, *Queen's-road, Richmond, Surrey; and Athe næum Club,* S.W.
June 8, 1882.	'91–93			Godman, Frederick Ducane, D.C.L. (Oxon), F.L.S. 10, *Chandos-street, Cavendish-square,* W.; *and South Lodge, Horsham.*
June 3, 1880.				Godwin-Austen, Henry Haversham, Lieut.-Col., F.G.S. *Shalford House, Guildford.*
June 1, 1865.				Gore, George, LL.D. (Edin.). *Inst. Sci. Research,* 20, *Easy Row, Birmingham.*
Dec. 17, 1896.				Gorst, Right Hon. Sir John Eldon, Q.C., M.A. *Queen Anne's-mansions, St. James's-park,* S.W.; *and Howes Close, Cambridge.*
Jan. 18, 1872.				Goschen, Right Hon. George Joachim, M.A. 69, *Portland-place,* W.
June 2, 1892.				Gotch, Francis, M.A., B.Sc., Waynflete Professor of Physiology in the University of Oxford. *The Lawn, Banbury-road, Oxford.*
June 9, 1887.				Gowers, Sir William Richard, M.D., F.R.C.P., Consulting Physician to University College Hospital; Physician to the National Hospital for the Paralysed and Epileptic. 50, *Queen Anne-street,* W.
Feb. 3, 1881.				Grant Duff, Right Hon. Sir Mountstuart Elphinstone, G.C.S.I., F.R.G.S. 11, *Chelsea Embankment; and Athenæum Club.*
June 4, 1896.				Gray, Andrew, M.A., Professor of Natural Philosophy in the University of Glasgow. 11, *The University, Glasgow.*
June 13, 1895.				Green, Joseph Reynolds, M.A., D.Sc., Professor of Botany to the Pharmaceutical Society of Great Britain. *Arncliffe, Grange-road, Cambridge.*
June 7, 1888.	'96–97			Greenhill, Alfred George, M.A., Professor of Mathematics in the Artillery College, Woolwich. 10, *New Inn,* W.C.
June 6, 1878.				Greenwell, Rev. William, M.A., D.C.L., Canon of Durham. *Durham.*
June 13, 1895.				Griffiths, Ernest Howard, M.A. 12, *Parkside, Cambridge.*
June 7, 1883.				Groves, Charles Edward, F.C.S., F.I.C. 352, *Kennington-road,* S.E.

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June 7, 1883.				Grubb, Sir Howard, F.R.A.S. 51, *Kenilworth-square, Rathgar, Dublin.*
June 6, 1867.	'74–76	V.P. '75–76	R.	Günther, Albert C. L. G., M.A., M.D., late Keeper of the Zoological Department in the British Museum. *Lichfield-road, Kew Gardens, Surrey.*
June 1, 1899.				Haddon, Alfred Cort, M.A., M.R.I.A., F.Z.S., Professor of Zoology in the Royal College of Science, Ireland. *Inisfail, Hills-road, Cambridge.*
June 3, 1897.				Haldane, John Scott, M.A., M.D., Lecturer in Physiology in the University of Oxford. 11, *Crick-road, Oxford.*
June 4, 1891.	'98–			Halliburton, William Dobinson, M.D., B.Sc., F.R.C.P., Professor of Physiology in King's College, London. *Church Cottage*, 17, *Marylebone-road*, N.W.
Jan. 13, 1887.				Halsbury, Right Hon. Hardinge Stanley Giffard, Earl of, M.A., D.C.L. 4, *Ennismore-gardens*, W.
June 4, 1863.	'78–80			Harcourt, Augustus George Vernon, M.A., D.C.L., Lee's Reader in Chemistry at Christ Church. *Cowley Grange, Oxford; and Athenæum Club*, S.W.
Dec. 15, 1881.				Harcourt, Right Hon. Sir William George Granville Venables Vernon, Kt., M.A. *Malwood, Lyndhurst, Hants.*
June 4, 1863.				Harley, Rev. Robert, M.A. *Rosslyn, Westbourne-road, Forest-hill*, S.E.; *and Athenæum Club*, S.W.
June 9, 1898.				Harmer, Sidney Frederic, M.A., Sc.D., Superintendent of the University Museum of Zoology, Cambridge. *King's College, Cambridge.*
June 12, 1884.				Hartley, Walter Noel, F.R.S.E., F.I.C., Professor of Chemistry in the Royal College of Science for Ireland. *Royal College of Science, Stephen's-green, Dublin; and* 36, *Waterloo-road, Dublin.*
June 3, 1897.				Haswell, William, M.A., D.Sc., Challis Professor of Zoology in the University of Sydney. *The University, Sydney, N.S.W.*
June 2, 1864.				Hay, Right Hon. Sir John Charles Dalrymple, Bart., Admiral, K.C.B., D.C.L. 108, *St. George's-square*, S.W.; *and Craigenveoch, Wigtownshire*, N.B.
June 1, 1876.				Hayward, Robert Baldwin, M.A. *Ashcombe, Shanklin, Isle of Wight.*
June 1, 1899.				Head, Henry, M.A., M.D., M.R.C.P., M.R.C.S. 61, *Wimpole-street*, W.
June 4, 1891.				Heaviside, Oliver. *Bradley View, Newton Abbot, Devon.*
June 7, 1866.				Hector, Sir James, K.C.M.G., M.D., Director of the Geological Survey, Colonial Laboratory, Meteorological and Weather Departments, and of the New

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				Zealand Institute; Chancellor of the New Zealand University. *Wellington, New Zealand.*
June 1, 1899.				Hele-Shaw, Henry Selby, LL.D. (St. Andrew's), Harrison Professor of Engineering in University College, Liverpool. 27, *Ullett-road, Sefton-park, Liverpool.*
June 6, 1889.				Hemsley, William Botting, F.L.S., Keeper of the Herbarium, Royal Gardens, Kew. *Herbarium, Royal Gardens, Kew.*
June 3, 1875.				Hennessey, John Baboneau Nickterlien, C.I.E., M.A., late Deputy Surveyor General in charge of the Trigonometrical Surveys, Survey of India. *Merrimu,* 18, *Alleyn-park, West Dulwich,* S.E.; *and Athenæum Club,* S.W.
June 3, 1858.				Hennessy, Henry G., M.R.I.A., Professor of Applied Mathematics and Mechanism in the Roy. Coll. of Science for Ireland. *Palazzo Ferruzzi, Zattere* 1401, *Venice.*
June 4, 1874.	'82–83			Henrici, Olaus Magnus Friedrich Erdmann, Ph.D., LL.D., Professor of Mechanics and Mathematics in the City and Guilds of London Institute. *Central Technical College, Exhibition-road,* S.W.; *and* 34, *Clarendon-road, Notting Hill,* W.
June 2, 1892.	'98–			Herdman, William Abbott, D.Sc., F.L.S., Professor of Natural History in University College, Liverpool. *Croxteth Lodge, Ullett-road, Liverpool.*
June 12, 1884.				Herschel, Alexander Stewart, M.A., D.C.L., Honorary Professor of Physics and Experimental Philosophy in the Durham College of Science, Newcastle-on-Tyne. *Observatory House, Slough, Bucks.*
June 8, 1871.				Herschel, John, Col., R.E., F.R.A.S., late Deputy Superintendent, Great Trigonometrical Survey of India. *Observatory House, Slough, Bucks.*
June 13, 1895.				Heycock, Charles Thomas, M.A., Lecturer on Natural Science, King's College, Cambridge. 24, *Fitzwilliam-street, Cambridge.*
June 4, 1885.				Hicks, William Mitchinson, M.A., D.Sc., Principal and Professor of Physics in University College, Sheffield. *Dunheved, Endcliffe-crescent, Sheffield.*
June 13, 1895.				Hickson, Sydney John, D.Sc., M.A., Professor of Zoology in Owens College, Manchester. *Ellesmere House, Withington, Manchester.*
June 7, 1894.				Hill, Micaiah J.M., M.A., D.Sc., Professor of Mathematics, University College, London. *Lakeview, Northwood, Middlesex.*

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June 4, 1896.				Hinde, George Jennings, Ph.D. *Ivythorn, Avondale-road, S. Croydon.*
June 1, 1893.				Hobson, Ernest William, D.Sc., Fellow of Christ's College, Cambridge. *The Gables, Mount Pleasant, Cambridge.*
June 13, 1895.				Holden, Henry Capel Lofft, Major, R.A. *The Eaves, Belvedere, Kent.*
Apr. 22, 1847.	'53–54 '56–58 '62–64 '70–80 '84–86	PRES. '73–78 V.P. '57–58 '63–64 '78–80 '84–86	C. R. Dw.	Hooker, Sir Joseph Dalton, G.C.S.I., D.C.L., LL.D. *The Camp, Sunningdale, Berkshire.*
June 4, 1886.	'98–99		R.	Horsley, Victor Alexander Haden, B.S., F.R.C.S., M.D., late Professor of Pathology in University College, London. 25, *Cavendish-square*, W.; *and Athenæum Club*, S.W.
June 3, 1897.				Howes, George Bond, F.L.S., F.Z.S., Professor of Zoology in the Royal College of Science, London. "*Ingledene*," *Barrowgate-road, Chiswick*, W.
June 1, 1893.				Howorth, Sir Henry Hoyle, K.C.I.E., D.C.L. 30, *Collingham-place, Cromwell-road*, S.W.
June 12, 1884.				Hudleston, Wilfrid H., M.A., F.G.S. 8, *Stanhope-gardens, South Kensington*, S.W.
June 6, 1889.				Hudson, Charles Thomas, M.A., LL.D. *Briar Knoll, Lake, Sandown, Isle of Wight.*
June 1, 1865.	'66–68 '69–71 '80–82 '88–89 '95–97	V.P. '70–71 '95–97	C. Rm. R.	Huggins, Sir William, K.C.B., D.C.L., LL.D. 90, *Upper Tulse-hill; and Athenæum Club*, S.W.
June 3, 1880.			R.	Hughes, David Edward, Past-Pres. Soc. Teleg. Eng. 40, *Langham-street, Portland-place*, W.
June 6, 1889.				Hughes, Thomas McKenny, M.A., F.G.S., Woodwardian Professor of Geology in the University of Cambridge. 18, *Hills-road, Cambridge.*
June 6, 1867.				Hull, Edward, M.A., LL.D., late Director of the Geological Survey of Ireland, and Professor of Geology in the Royal College of Science. 20, *Arundel-gardens, Notting-hill*, W.
June 8, 1882.				Hutchinson, Jonathan, LL.D., M.D., formerly President of and Professor of Pathology and Surgery in the Royal College of Surgeons. 15, *Cavendish-square*, W.
June 2, 1892.				Hutton, Frederick Wollaston, Captain, F.G.S., C.M.Z.S., Curator of the Canterbury Museum, Christchurch. *Canterbury Museum, Christchurch, New Zealand.*

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June 6, 1878.				Jackson, John Hughlings, M.D., Consulting Physician to the London Hospital. 3, *Manchester-square*, W.
Feb. 5, 1891.				Jackson, Right Hon. William Lawies, 27, *Cadogan-square*, S.W.; *and Allerton Hall, Chapel Allerton, Leeds.*
June 4, 1885.				Japp, Francis Robert, M.A., LL.D., Professor of Chemistry in the University of Aberdeen. *University, Aberdeen.*
June 7, 1894.				Jervis-Smith, Rev. Frederick John, M.A., University Lecturer in Mechanics and Millard Lecturer in Experimental Mechanics, Trinity College, Oxford. 28, *Norham Gardens, Oxford.*
June 2, 1892.				Joly, John, M.A., B.E., D.Sc., Professor of Geology and Mineralogy in the University of Dublin. 12, *Northbrook-road, Leeson Park, Dublin.*
June 7, 1894.				Jones, John Viriamu, M.A., B.Sc., Principal and Professor of Physics in the University College of South Wales and Monmouthshire. 42, *Park-place, Cardiff.*
June 6, 1872.				Jones, Thomas Rupert, F.G.S. 17, *Parson's Green, Fulham*, S.W.
June 7, 1877.	'87–89			Judd, John Wesley, C.B., F.G.S., Professor of Geology in the Royal College of Science, London. 22, *Cumberland-road, Kew; Royal College of Science, South Kensington; and Athenæum Club*, S.W.
June 5, 1851.	'90–96	PRES. '90–95	C. R.	Kelvin, William Thomson, Lord, D.C.L., LL.D., Late Professor of Natural Philosophy in the University of Glasgow. *Netherhall, Largs, Ayrshire; and Athenæum Club*, S.W.
June 2, 1881.	'97–	V.P. TREAS. '98–		Kempe, Alfred Bray, M.A. 2, *Paper-buildings, Temple*, E.C.; *and* 10, *Porchester-square, Hyde Park*, W.
June 9, 1887.	'95–96			Kennedy, Alexander B. W., LL.D., Mem. Inst. C.E., Emeritus Professor of Engineering and Mechanical Technology in University College, London. 1, *Queen Anne-street, Cavendish-square*, S.W.
June 5, 1890.			R.	Kerr, Rev. John, LL.D., Mathematical Lecturer in the Free Church Training College, Glasgow. 118, *Hill-street, Glasgow.*
June 9, 1887.				King, Sir George, K.C.I.E., M.B., LL.D., late Superintendent of the Royal Botanical Gardens, Calcutta, and of the Government Cinchona Plantations, Darjeeling. c/o *Messrs. Grindlay & Co.*, 54, *Parliament-street*, S.W.

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				Kingsburgh (*see* Macdonald).
June 3, 1897.				Kipping, F. Stanley, D.Sc. (Lond.), Professor of Chemistry, University College, Nottingham. *University College, Nottingham.*
June 9, 1887.	'93–95	V.P. '94–95		Kirk, Sir John, G.C.M.G., K.C.B., LL.D. *Wavertree, Sevenoaks, Kent; and Athenæum Club*, S.W.
June 3, 1875.	'88–90			Klein, Edward Emanuel, M.D., Lecturer on General Anatomy and Physiology in the Medical School, St. Bartholomew's Hospital. 19, *Earl's Court-square*, S.W.
June 12, 1884.	'94–96			Lamb, Horace, M.A., Professor of Mathematics in the Owens College, Manchester. 6, *Wilbraham-road, Fallowfield, Manchester.*
June 7, 1883.	'97–98		R.	Langley, John Newport, M.A., Fellow and Lecturer of Trinity College, Lecturer on Histology in the University of Cambridge. *Trinity College, Cambridge; and Athenæum Club*, S.W.
June 3, 1875.	'82–83 '88–90 '94–96	V.P. '95–96 '82–83	R.	Lankester, Edwin Ray, M.A., LL.D., Director of the Natural History Departments, British Museum. *British Museum (Nat. Hist.), Cromwell-road*, S.W.; *and Athenæum Club*, S.W.
June 7, 1888.	'95–97		R.	Lapworth, Charles, LL.D., F.G.S., Professor of Geology in the Mason Science College, Birmingham. 28, *Duchess-road, Edgbaston, Birmingham.*
June 2, 1892.	'97–99			Larmor, Joseph, M.A., D.Sc., late Professor of Natural Philosophy in Queen's College, Galway. *St. John's College, Cambridge.*
June 7, 1854.			R.	Lawes, Sir John Bennet, Bart., D.C.L., LL.D. *Rothamsted, St. Albans.*
June 5, 1890.				Lea, Arthur Sheridan, Sc.D., Lecturer in Physiology of Gonville and Caius College; Assistant Lecturer of Trinity College, and University Lecturer, Cambridge. *Gonville and Caius College, Cambridge.*
Jan. 26, 1899.				Lefevre, Right Hon. George John Shaw, M.A., 18, *Bryanston Square*, W.; *and Abbotsworthy House, Kingsworthy, Winchester.*
Jan. 20, 1898.				Lindley, Right Hon. Sir Nathaniel, Master of the Rolls. 19, *Craven Hill-gardens*, W.; *and Athenæum Club*, S.W.
June 9, 1898.				Lister, Arthur, F.L.S. *Leytonstone, Essex.*
June 7, 1860.	'81–83 '93–	FOR. SEC. '93–95 PRES. '95–	R.	Lister, Joseph, Lord,—PRESIDENT, F.R.C.S., D.C.L., LL.D., Emeritus Professor of Clinical Surgery, King's College, London, Surgeon Extraordinary to the Queen. 12, *Park-crescent, Portland-place*, W.

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June 12, 1879.	'91–92	V.P. '91–92		Liveing, George Downing, M.A., Sc.D., Professor of Chemistry in the University of Cambridge. *Newnham, Cambridge.*
June 8, 1882.				Liversidge, Archibald, M.A., LL.D., Professor of Chemistry in the University of Sydney. *St. Mark's Road, Darling Point, Sydney, New South Wales.*
June 3, 1869.	'74–76 '85–87 '91–93	V.P. '92–93	Rm.	Lockyer, Sir Norman, K.C.B., 16, *Penywern-road*, S.W.; *and Solar Physics Observatory, South Kensington*, S.W.
June 9, 1887.	'93–94		Rm.	Lodge, Oliver Joseph, D.Sc., LL.D., Professor of Physics in University College, Liverpool. 2, *Grove-park, Liverpool.*
June 7, 1894.				Love, Augustus Edward Hough, M.A., Fellow of St. John's College, Cambridge; Sedleian Professor of Natural Philosophy in the University of Oxford. 34, *St. Margaret's Road, Oxford.*
June 6, 1867.				Lowe, Edward Joseph, F.R.A.S., F.L.S. *Shirenewton Hall, near Chepstow, Monmouthshire.*
June 3, 1858.	'61–63 '70–72 '78–79 '93–94	V.P. '71–72 '78–79 '93–94		Lubbock, Right Hon. Sir John, Bart., D.C.L., LL.D. *High Elms, Down, Kent.*
June 7, 1894.				Lydekker, Richard, B.A. *The Lodge, Harpenden, Herts.*
June 2, 1881.	'94–95			Macalister, Alexander, M.A., M.D., Professor of Anatomy in the University of Cambridge. *Torrisdale, Cambridge.*
June 13, 1895.				M'Clean, Frank, M.A., LL.D. *Rusthall House, Tunbridge Wells.*
June 1, 1865.				M'Clintock, Sir Francis Leopold, Admiral, K.C.B., D.C.L., LL.D. 8, *Atherstone-terrace, Gloucester-road*, S.W.
June 9, 1859.				Macdonald, John Denis, M.D., Inspector-General of Hospitals and Fleets, R.N. *Amwell-place, Hassocks, Sussex.*
May 3, 1888.				Macdonald, Right Hon. John Hay Athole, C.B., LL.D., Lord Justice-Clerk of Scotland, and Lord President of the Second Division of the Court of Session. 15, *Abercromby-place, Edinburgh.*
June 13, 1895.				Macewen, William, M.D., LL.D., Professor of Surgery in the University of Glasgow, 3, *Woodside-crescent, Glasgow.*
June 7, 1877.			R.	M'Intosh, William Carmichael, M.D., LL.D., Professor of Natural History in the University of St. Andrews; Director of the University Museum, and of the Marine Laboratory, St. Andrews. 2, *Abbotsford-crescent, St. Andrews, Scotland*

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June 12, 1884.	'92–93			McKendrick, John Gray, M.D., LL.D., Professor of Physiology in the University of Glasgow. 2, *Florentine-gardens, Glasgow.*
June 7, 1877.				McLachlan, Robert, F.L.S., F.E.S. *Westview*, 23, *Clarendon-road, Lewisham*, S.E.
June 2, 1881.	'87–89			McLeod, Herbert, F.I.C., F.C.S., Professor of Chemistry in the Royal Indian Engineering College, Cooper's-hill. *The College, Cooper's-hill, Staines.*
June 9, 1898.				McMahon, Charles Alexander, Lieut.-General, V.P.G.S. 20, *Nevern-square*, S.W.
June 5, 1890.	'95–97			MacMahon, Percy Alexander, Major, R.A., D.Sc., F.R.A.S. *Shaftesbury-mansions*, 52, *Shaftesbury-avenue*, W.
June 8, 1882.				Malet, John Christian, M.A., Assistant Commissioner of Intermediate Education, Ireland. *Carbery, Silchester-road, Kingstown, Co. Dublin.*
June 7, 1877.				Mallet, John William, M.D., LL.D. *University of Virginia, Albemarle Co., Virginia, United States.*
June 11, 1857.				Marcet, William, M.D. *Flower-mead, Prince's-road. Wimbledon-park*, S.W.; *and Athenæum Club*, S.W.
June 12, 1873.				Markham, Sir Clements Robert, K.C.B., P.R.G.S. *Athenæum Club; and* 21, *Eccleston-square*, S.W.
June 4, 1891.				Marr, John Edward, M.A., F.G.S., Fellow and Lecturer of St. John's College, Cambridge, and University Lecturer in Geology. *St. John's College, Cambridge.*
June 13, 1895.				Martin, Sidney, M.D., F.R.C.P., Assistant Physician in University College Hospital, and in the Hospital for Consumption, Brompton. 10, *Mansfield-street, Cavendish-square*, W.
June 2, 1870.	'73–75, 97–99	V.P. '97–99		Maskelyne, Nevil Story, M.A., F.G.S., late Professor of Mineralogy in the University of Oxford. *Basset Down House, Swindon.*
June 2, 1870.				Masters, Maxwell Tylden, M.D., F.L.S. *Mount Avenue, Ealing*, W.
June 3, 1897.				Mathews, George Ballard, M.A., late Professor of Mathematics in the University College of North Wales, 10, *Menai View, Upper Bangor, North Wales.*
June 12, 1879.				Matthey, George, F.C.S., Assoc. Inst. C.E. *Cheyne House, Chelsea Embankment*, S.W.
Jan. 27, 1898.				Maxwell, Right Hon. Sir Herbert Eustace, Bart. 49, *Lennox Gardens*, S.W.; *and The Airlour, Whauphill, Wigtownshire, N.B.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 7, 1877.				Medlicott, Henry Benedict, M.A., F.G.S., late Director of the Geological Survey of India. 43, *St. John's-road, Clifton, Bristol.*
June 4, 1886.	'96–98			Meldola, Raphael, F.C.S., F.I.C., Professor of Chemistry in the Finsbury Technical College, City and Guilds of London Institute. 6, *Brunswick-square*, W.C.
June 1, 1876.				Meldrum, Charles, C.M.G., M.A., LL.D., late Director of the Royal Alfred Observatory, Mauritius. c/o *W. P. Meldrum, Esq., University Hall, Riddle's Court, Edinburgh.*
June 2, 1892.				Miall, Louis Compton, F.L.S., F.G.S., Professor of Biology in the Yorkshire College, Leeds. 8, *Spring-road, Headingley, Leeds.*
June 4, 1896.				Miers, Henry Alexander, M.A., Professor of Mineralogy in the University of Oxford. *Magdalen College, Oxford.*
June 4, 1874.				Mills, Edmund James, D.Sc. F.I.C. Young Professor of Technical Chemistry in the Glasgow and West of Scotland Technical College, Glasgow. 60, *John-street, Glasgow.*
June 9, 1887.				Milne, John, F.G.S., late Professor of Mining and Geology in the Imperial College of Engineering, Japan. *Shide Hill House, Shide, Newport, I.W*
June 13, 1895.				Minchin, George M., M.A., Professor of Mathematics in the Royal Indian Engineering College, Cooper's-hill. *The College, Cooper's-hill, Staines.*
June 3, 1869.				Mivart, St. George, Ph.D., M.D., Professor of the Philosophy of Biology n the University of Louvain. 77, *Inverness-terrace*, W.
June 8, 1871.				Moncrieff, Sir Alexander, Colonel (late R.A.), K.C.B. 15, *Vicarage-gate, Kensington*, W.; *and Athenæum Club*, S.W.
June 4, 1891.				Mond, Ludwig, Ph.D., F.I.C. *The Poplars*, 20, *Avenue-road, Regent's-park*, N.W.; *and Winnington Hall, Northwich.*
June 1, 1899.				Morgan, Conwy Lloyd, F.G.S., Professor of Biology and Geology in University College, Bristol. 16, *Canynge-road, Clifton, Bristol.*
Dec. 15, 1892.				Morley, Right Hon. John, M.A., D.C.L., LL.D. 95, *Elm Park Gardens; and Athenæum Club*, S.W.
June 4, 1896.				Mott, Frederick Walker, M.D. *Pathological Laboratory, Claybury Asylum, Essex; and* 25, *Nottingham-place, W.*
June 3, 1880.				Moulton, John Fletcher, Q.C., M.A. 57, *Onslow-square*, S.W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 7, 1866.	'83–85 '89–91			Müller, Hugo, Ph.D., LL.D. 13, *Park-square East*, N.W.; *Crosby-hill, Camberley, Surrey; and Athenæum Club*, S.W.
June 3, 1897.				Murray, George Robert Milne, F.L.S., F.R.S.E., Keeper of the Botanical Department, British Museum. *Natural History Museum, Cromwell-road*, S.W.; *and Willow House, The Green, Ealing*, W.
June 4, 1896.			R.	Murray, Sir John, K.C.B., Ph.D. *Challenger Lodge, Wardie, Edinburgh.*
June 3, 1875.				Nares, Sir George Strong, Vice-Admiral, K.C.B. 11, *Claremont-road, Surbiton.*
June 3, 1897.				Neville, Francis Henry, M.A., Fellow and Lecturer in Natural Science, Sydney College. *Sidney College, Cambridge.*
June 2, 1870.	'79–81 '89–91	V.P. '89–91		Newton, Alfred, M.A., F.L.S., Professor of Zoology and Comparative Anatomy in the University of Cambridge. *Magdalene College, Cambridge.*
June 1, 1893.				Newton, Edwin Tulley, F.G.S., F.Z.S. *Geological Museum, Jermyn-street*, S.W.
June 3, 1880.				Niven, Charles, M.A., F.R.A.S., Professor of Natural Philosophy in the University, Aberdeen. 6, *Chanonry, Old Aberdeen.*
June 8, 1882.	92–94			Niven, William Davidson, C.B., M.A., Director of Studies in the Royal Naval College, Greenwich. *Greenwich*, S.E.
June 2, 1870.	'84–85 '89–90 '98–	V.P. '99–	R.	Noble, Sir Andrew, Capt., K.C.B., F.C.S. *Jesmond Dene House, Newcastle-upon-Tyne; and Athenæum Club*, S.W.
June 5, 1890.				Norman, Rev. Alfred Merle, M.A., D.C.L., Hon. Canon of Durham. *The Red House, Berkhamsted.*
Jan. 8, 1880.				Northbrook, Thomas George Baring, Earl of, G.C.S.I., LL.D., D.C.L. 4, *Hamilton-place*, W.; *and Stratton, Micheldever Station, Hants.*
June 9, 1859.	'64–66 '79–81			Odling, William, M.B., V.P.C.S., Waynflete Professor of Chemistry in the University of Oxford. *Museum; and* 15, *Norham-gardens, Oxford.*
June 4, 1863.	'75–76 '80–82		R.	Oliver, Daniel, LL.D., F.L.S., late Keeper of the Herbarium and Library, Royal Gardens, Kew; Emeritus Professor of Botany, University College, London. 10, *Kew Gardens-road, Kew.*
June 4, 1868.				Ommanney, Sir Erasmus, Admiral, Knt., C.B., LL.D. 29, *Connaught-square, Hyde Park*, W.; *and United Service Club.*
June 7, 1855.				Osler, Abraham Follett. *South Bank, Edgbaston, Birmingham.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 9, 1898.				Osler, William, M.D., F.R.C.P., Professor of Medicine in the Johns Hopkins University, Baltimore. 1, *West Franklin-street, Baltimore, Md., U.S.A.*
June 4, 1885.				O'Sullivan, Cornelius, F.I.C., F.C.S. 148, *High-street, Burton-on-Trent.*
June 8, 1882.				Palgrave, Robert Harry Inglis, F.S.S. *Belton, Great Yarmouth.*
June 9, 1898.				Parsons, Hon. Charles Algernon, M.A., M. Inst. C.E. *Holeyn Hall, Wylam-on-Tyne.*
June 4, 1863.				Pavy, Frederick William, M.D., LL.D., Consulting Physician and formerly Lecturer on Physiology and Comparative Anatomy and Zoology, and on Medicine, at Guy's Hospital, 35, *Grosvenor-street,* W.
June 2, 1892.				Peach, Benjamin Neeve, F.R.S.E., F.G.S. *Geological Survey Office, Sheriff Court-buildings, Edinburgh.*
June 4, 1896.			Dw.	Pearson, Karl, M.A., Professor of Mathematics and Mechanics in University College, London. 7, *Well-road, Hampstead,* N.W.
June 2, 1892.				Pedler, Alexander, F.C.S., F.I.C., Professor of Chemistry, Presidency College, Calcutta; and Meteorological Reporter to the Government of Bengal. 31 *f*2, *Judge's Court-road, Alipur, Calcutta.*
June 7, 1894.				Penrose, Francis Cranmer, M.A., F.R.A.S., Honorary Fellow of Magdalene College, Cambridge. *Colebyfield, Copse Hill, Wimbledon,* S.W.
June 7, 1866.	'79-81 '92-94	V.P. '93-94	D. R.	Perkin, William Henry, LL.D., Ph.D. *The Chestnuts, Sudbury, Harrow.*
June 5, 1890.				Perkin, William Henry, junior, Ph.D., F.I.C., Professor of Organic Chemistry in Owens College, Manchester. *Fairview, Wilbraham-road, Fallowfield, Manchester.*
June 4, 1885.				Perry, John, D.Sc., Professor of Mechanics and Mathematics in the Royal College of Science. *Royal College of Science, S. Kensington,* S.W.
June 4, 1868.				Pettigrew, James Bell, M.D., F.R.C.P. (Edin.), Professor of Medicine and Anatomy and Dean of the Medical Faculty in the University of St. Andrews. *St. Andrews, N.B.*
June 9, 1887.				Pickard-Cambridge, Rev. Octavius, M.A. *Bloxworth, Wareham, Dorset.*
June 5, 1890.				Pickering, Spencer Percival Umfreville, M.A., F.C.S. *Harpenden, Herts; and* 48, *Bryanston-square,* W.

Date of Election.	Member of Council.	He'd Office.	Medals.	
April 4, 1889.				Pirbright, Right Hon. Henry de Worms, Lord. 42, *Grosvenor-place*, S.W.; *Henley-park, Guildford.*
June 1, 1876.				Pitt-Rivers, Augustus Henry Lane-Fox, Lieut.-General, D.C.L., F.S.A. *Rushmore, Salisbury.*
June 6, 1861.	'63-65 '75-77 '87-89	V.P. '75-76		Pole, William, Mus. Doc. Oxon., Hon. Mem. Inst. C.E. 9, *Stanhope-place*, W.; *and Athenæum Club*, S.W.
June 6, 1889.	'97-99			Poulton, Edward Bagnall, M.A. (Oxon.), F.L.S., Hope Professor of Zoology in the University of Oxford. *Wykeham House, Banbury-road, Oxford; and St. Helen's Cottage, St. Helen's, Isle of Wight.*
June 13, 1895.				Power, William Henry, Assistant Medical Officer, Local Government Board. *Glenbrook, Greenhithe; and Local Government Board, Whitehall*, S.W.
June 7, 1888.	'94-96			Poynting, John Henry, D.Sc., Professor of Physics at the Mason College, Birmingham. *Foxhill, Alvechurch, Worcestershire.*
June 2, 1881.	'87-89			Preece, Sir William Henry, K.C.B., Pres. Inst. C.E. *Gothic Lodge, Wimbledon.*
June 9, 1898.				Preston, Thomas, M.A., Professor of Natural Philosophy in University College, Dublin. *Bardowie, Orwell Park, Rathgar, Dublin.*
June 13, 1895.				Purdie, Thomas, B.Sc., Ph.D., Professor of Chemistry in the University of St. Andrews. *The University, St. Andrews.*
June 4, 1886.	'91-92			Pye-Smith, Philip Henry, M.D., F.R.C.P., Physician to Guy's Hospital. 48, *Brock-street*, W.
June 7, 1888.	'96-97		D.	Ramsay, William, Ph.D., F.I.C., Professor of Chemistry in University College, London. 12, *Arundel-gardens, Notting-hill*, W.
June 2, 1870.				Ransome, William Henry, M.D., Consulting Physician to the General Hospital, Nottingham. *The Pavement, Nottingham.*
June 12, 1884.				Ransome, Arthur, M.A., M.D., late Professor of Public Health in Owens College, Manchester. *Sunnyhurst, Dean-park, Bournemouth.*
June 12, 1873.	'77-79 '84-96	SEC. '85-96	R. C.	Rayleigh, John William Strutt, Lord, M.A., D.C.L., Professor of Natural Philosophy in the Royal Institution. *Terling Place, Witham, Essex.*
June 1, 1876.				Reed, Sir Edward James, K.C.B. *Broadway-chambers, Westminster*, S.W.
June 1, 1899.				Reid, Clement, F.G.S., F.L.S. *Geological Museum*, 28, *Jermyn-street*, S.W.
June 9, 1898.				Reid, Edward Waymouth, B.A., M.B., Professor of Physiology in University College, Dundee. *University College, Dundee.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 7, 1883.	'99–			Reinold, Arnold William, M.A., Professor of Physics in the Royal Naval College, Greenwich. 15, *Glenluce-road, Blackheath*, S.E.
June 3, 1880.				Reynolds, J. Emerson, M.D., Sc.D., Professor of Chemistry, University of Dublin. *Burleigh House, Burlington-road, Dublin.*
June 7, 1877.	'82-84		R.	Reynolds, Osborne, M.A., LL.D., Professor of Engineering in Owens College, Manchester. 19, *Lady Barn-road, Fallowfield, Manchester.*
Jan. 13, 1842.				Riddell, Charles James Buchanan, Major-Gen., C.B. *Oaklands, Chudleigh, Devonshire.*
June 4, 1885.				Ringer, Sydney, M.D., Holme Professor of Clinical Medicine, University College, London. 15, *Cavendish-place*, W.
May 24, 1860.				Ripon, George Frederick Samuel Robinson, Marquis of, K.G., D.C.L., F.L.S., 9, *Chelsea Embankment*, S.W.; *and Studley Royal, Ripon, Yorkshire.*
June 5, 1890.				Roberts, Isaac, ScD., F.R.A.S. *Starfield, Crowborough, Sussex.*
June 6, 1878.				Roberts, Samuel, M.A. 27, *Nassington-road, Hampstead*, N.W.
June 3, 1875.	'90-92			Roberts-Austen, Sir William Chandler, K.C.B., F.C.S., Prof. of Metallurgy, Royal College of Science, Chemist of the Royal Mint. *Royal Mint, Tower-hill*, E.; *Chilworth, Guildford; and Athenæum Club*, S.W.
Dec. 14, 1899.				Romer, Right Hon. Sir Robert. Lord Justice of Appeal, 27, *Harrington-gardens*, S.W.
June 4, 1863.	'72–73 '81–83 '88–90	V.P. '81–82 '88–90	R.	Roscoe, Sir Henry Enfield, Knt., D.C.L., LL.D., Emeritus Professor of Chemistry in Victoria University (Owens College). 10, *Bramham-gardens*, S.W.; *and Athenæum Club*, S.W.
June 10, 1886.				Rosebery, Right Hon. Archibald Philip Primrose, Earl of, K.G., D.C.L. 38, *Berkeley-square*, W.; *and Dalmeny-park, Linlithgowshire.*
Dec. 19, 1867.	'71–72 '87–88	V.P. '71–72 '87–88		Rosse, Laurence Parsons, Earl of, K.P., D.C.L., LL.D., Chancellor of the University of Dublin. *Birr Castle, Parsonstown, Ireland.*
June 6, 1872.	'88–90			Routh, Edward John, D.Sc., LL.D. *Newnham Cottage, Queen's-road, Cambridge.*
June 12, 1884.	'87–89 '94–99	SEC. '96–	R.	Rücker, Arthur William, M.A., D.Sc., Professor of Physics, Royal College of Science, London. 19, *Gledhow-gardens, South Kensington*, S.W.; *and Athenæum Club*, S.W.
June 4, 1886.				Russell, Henry Chamberlaine, C.M.G., B.A., F.R.A.S., Government Astronomer of New South Wales. *The Observatory, Sydney, N.S. Wales.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 6, 1872.	'85–86 '97–99	V.P. '97–99		Russell, William James, Ph.D., V.P.C.S., Lecturer on Chemistry at the Medical School of St. Bartholomew's Hospital. 34, *Upper Hamilton-terrace*, N.W.
Jan. 28, 1869.	'69–70 '82–83 '92–94	V.P. '82–83 '93–94		Salisbury, The Most Hon. Robert Arthur Talbot Gascoigne-Cecil, Marquis of, K.G., M.A., D.C.L., Chancellor of the University of Oxford. 20, *Arlington-street*, S.W.; *and Hatfield House, Hatfield, Herts.*
June 4, 1863.			C. R.	Salmon, Rev. George, D.D., D.C.L., LL.D., Provost of Trin. Coll., Dublin. *Trinity College, Dublin.*
June 2, 1881.	'87–88			Samuelson, Right Hon. Sir Bernhard, Bart., Mem. Inst. C.E. 56, *Princes-gate*, S.W.
June 6, 1867.	'73–75 '84–86 '93–95	V.P. '74–75 '94–95	R.	Sanderson, Sir John Burdon, Bart., M.A., M.D., Regius Professor of Medicine in the University of Oxford. *Physiological Laboratory; and* 64, *Banbury-road, Oxford.*
June 6, 1878.	'90–92			Schäfer, Edward Albert, M.R.C.S., Professor of Physiology in the University of Edinburgh. *University, Edinburgh.*
June 6, 1850.			D.	Schunck, Edward, F.C.S. *Kersal, Manchester.*
June 12, 1879.	'85–87 '98–99		R.	Schuster, Arthur, Ph.D., F.R.A.S., Professor of Physics in Owens College, Manchester. *Kent House, Victoria-park, Manchester.*
June 6, 1861.	'72–73 '86–87			Sclater, Philip Lutley, M.A., Ph.D., Secretary of the Zoological Society of London. 3, *Hanover-square*, W.; *and Odiham Priory, Winchfield, Hants.*
June 9, 1898.				Scott, Alexander, M.A., D.Sc. *Davy-Faraday Laboratory, Albemarle-street*, W.
June 7, 1894.	'97–99			Scott, Dukinfield Henry, M.A., Ph.D., Honorary Keeper of the Jodrell Laboratory, Royal Gardens, Kew. *Old Palace, Richmond, Surrey.*
June 2, 1870.				Scott, Robert Henry, M.A., D.Sc. (Dubl.), F.R. Met. Soc., Secretary to the Meteorological Council. 6, *Elm-park-gardens*, S.W.
June 4, 1886.	'92–94			Sedgwick, Adam, M.A., Fellow and Lecturer of Trin. Coll., Cambridge, and Reader of Animal Morphology in the University. 4, *Cranmer-road, Cambridge.*
June 12, 1879.				Seeley, Harry Govier, F.L.S., F.G.S., Professor of Geology and Geography with Mineralogy in King's College, London. 25, *Palace Gardens-terrace, Kensington*, W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 4, 1874.				Selwyn, Alfred Richard Cecil, C.M.G., F.G.S., late Director of the Geological Survey of Canada. *Sussex-street, Ottawa, Canada.*
June 9, 1898.				Seward, Albert Charles, M.A., University Lecturer in Botany, Cambridge. *Westfield, Huntingdon-road, Cambridge.*
June 5, 1890.				Sharp, David, M.B., C.M. (Edin.). *Museum of Zoology, Cambridge; and Hawthorndene, Hills-road, Cambridge.*
June 4, 1891.				Shaw, William Napier, M.A., Fellow and Senior Tutor of Emmanuel College, Cambridge. *Emmanuel College, Cambridge.*
June 9, 1898.				Shenstone, William Ashwell, F.I.C., F.C.S. *Clifton College; and Glenfarg Villa, Percival-road, Clifton, Bristol.*
June 1, 1893.				Sherrington, Charles Scott, M.A., M.D., Holt Professor of Physiology in University College, Liverpool. 16, *Grove-park, Liverpool.*
Jan. 9, 1845.	'69–70 '78–80	V.P. '79–80	B.	Simon, Sir John, K.C.B., F.R.C.S., D.C.L., Consulting Surgeon to St. Thomas's Hospital. 40, *Kensington-square*, W.
June 5, 1862.				Simpson, Maxwell, B.A., M.D., late Professor of Chemistry in Queen's College, Cork. 9, *Barton-street, West Kensington*, W.
				Smith (*see* Jervis-Smith).
June 9, 1887.				Snelus, George James, F.C.S., A.R.S.M. *Ennerdale Hall, Frizington, Cumberland.*
June 6, 1889.				Sollas, William Johnson, D.Sc., LL.D., Professor of Geology in the University of Oxford. 169, *Woodstock-road, Oxford.*
June 11, 1857.	'76–77		R.	Sorby, Henry Clifton, LL.D., F.L.S. *Broomfield, Sheffield.*
June 6, 1878.				Sprengel, Hermann Johann Philipp, Ph.D., F.C.S., Royal Prussian Professor (titular). *Savile Club*, 107, *Piccadilly*, W.
June 1, 1899.				Starling, Ernest Henry, M.D., F.R.C.P., 8, *Park-square West, Regent's Park*, N.W.
June 4, 1896.				Stebbing, Rev. Thomas Roscoe Rede, M.A. *Ephraim Lodge, The Common, Tunbridge Wells.*
June 4, 1896.				Stewart, Prof. Charles, LL.D. (Aberd.), M.R.C.S., Hunterian Professor of Human and Comparative Anatomy, Royal College of Surgeons. 38, *Lincoln's Inn Fields*, W.C.
June 1, 1893.				Stirling, Edward Charles, C.M.G., M.D., F.R.C.S., Lecturer on Physiology in the University of Adelaide. *The University, Adelaide, South Australia.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 5, 1851.	'54–92	SEC. '54–85 PRES. '85–90 V.P. '90–92	C. Rm.	Stokes, Sir George Gabriel, Bart., M.A., D.C.L., LL.D., Lucasian Professor of Mathematics in the University of Cambridge. *Lensfield Cottage, Cambridge; and Athenæum Club*, S.W.
June 2, 1881.				Stoney, Bindon Blood, LL.D., M. Inst. C.E. 14, *Elgin-road, Dublin.*
June 6, 1861.	'98–	V.P. '99–		Stoney, George Johnstone, M.A., D.Sc. 8, *Upper Hornsey-rise*, N.
June 1, 1854.	'72–74 '80–81 '84–86 '90–91	V.P. '80–81 '85–86	R.	Strachey, Sir Richard, Lieut.-General R.E., G.C.S.I., LL.D., Chairman Meteorological Council. '69, *Lancaster Gate, Hyde Park*, W.
Mar. 22, 1888.				Sudeley, Charles Douglas Richard Hanbury-Tracy, Lord. *Ormeley Lodge, Ham Common, Surrey.*
June 7, 1894.				Swan, Joseph Wilson, M.A., F.C.S. 58, *Holland-park*, W.
June 6, 1878.	'99–			Symons, George James, Sec. Roy. Met. Soc. 62, *Camden-square*, N.W.
June 1, 1899.				Tanner, Henry William Lloyd, M.A. (Oxon.), Professor of Mathematics and Astronomy in the University College of South Wales. 27, *Cwrt-y-Fil-road, Penarth, Glamorgan.*
June 9, 1898.				Taylor, Henry Martyn, Fellow of Trinity College, Cambridge. *The Yews, Queens-road, Cambridge.*
June 7, 1888.				Teale, Thomas Pridgin, M.A., F.R.C.S. 38, *Cookridge-street, Leeds.*
June 5, 1890.	'99–			Teall, J. J. H., M.A., F.G.S. 2, *Sussex-gardens, West Dulwich*, S.E.; *and Geological Museum, Jermyn-street*, S.W.
Mar. 12, 1896.				Temple, Rt. Hon. Sir Richard, Bart., G.C.S.I. *Heath Brow, Hampstead Heath*, N.W.; *The Nash, Kempsey, Worcestershire.*
June 3, 1869.				Tennant, James Francis, Lieut.-General, R.E., C.I.E. 11, *Clifton-gardens, Maida-hill*, W.
June 3, 1880.	'86–88 '96–97	V.P. '96–97		Thiselton-Dyer, Sir William Turner, K.C.M.G., C.I.E., M.A. (Oxon.), Director, Royal Gardens, Kew. *Royal Gardens, Kew.*
June 4, 1891.				Thompson, Silvanus Phillips, B.A., D.Sc., Principal and Professor of Physics in the City and Guilds of London Technical College, Finsbury. *Morland, Chislett-road, West Hampstead*, N.W.
June 3, 1897.				Thomson, John Millar, LL.D., F.C.S., Professor of Chemistry in King's College, London. 85, *Addison-road*, W.
June 12, 1884.	'89–91 '98–		R.	Thomson, Joseph John, M.A., Sc.D., Cavendish Professor of Experimental Physics, Cambridge. *Trinity College, Cambridge.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 1, 1893.				Thornycroft, John Isaac, M. Inst. C.E. *Eyot Villa, Chiswick Mall, Chiswick.*
June 1, 1876.	'90–91 '93–95	V.P. '94–95 FOR. SEC. '99–	R.	Thorpe, Thomas Edward, Sc.D., LL.D, Principal of the Government Laboratories. *Government Laboratories, Clement's-inn-passage, Strand,* W.C.; *and Athenæum Club,* S.W.
June 1, 1899.				Threlfall, Richard, M.A. 259, *Hagley-road, Edgbaston, Birmingham.*
June 3, 1869.				Thuillier, Sir Henry Edward Landor, General, R.A., C.S.I., F.R.G.S. *Tudor House, Richmond, Surrey; and Oriental Club,* W.
June 3, 1880.	'92–94			Tilden, William Augustus, D.Sc., F.I.C., Professor of Chemistry in the Royal College of Science, London. 9, *Ladbroke-gardens, Notting-hill,* W.
June 4, 1891.				Tizard, Thomas Henry, Captain R.N., C.B., F.R.G.S., Assistant Hydrographer to the Admiralty. *Hydrographic Department, Admiralty, Whitehall* S.W.
June 6, 1889.				Todd, Sir Charles, K.C.M.G., M.A., Postmaster-General, Superintendent of Telegraphs and Government Astronomer, South Australia. *The Observatory, Adelaide, South Australia.*
June 6, 1878.				Tomes, Charles Sissmore, M.A. 9, *Park-crescent, Portland-place,* W.
June 6, 1889.				Tomlinson, Herbert, B.A. 65, *Oakley-street, Chelsea,* S.W.
June 1, 1893.				Trail, James William Helenus, A.M., M.D., Regius Professor of Botany in the University of Aberdeen. *The University, Aberdeen.*
June 2, 1881.				Traquair, Ramsay H., M.D., LL.D., Keeper of the Natural History Collections in the Museum of Science and Art, Edinburgh. 8, *Dean Park-crescent, Edinburgh.*
June 7, 1883.				Trimen, Roland, M.A., F.L.S., F.Z.S., late Curator of the South African Museum. 22, *Upper Gloucester-place,* N.W.
June 4, 1868.				Tristram, Rev. Henry Baker, D.D., LL.D., Canon of Durham. *College, Durham.*
June 3, 1897.				Trouton, Frederick Thomas, M.A., Sc.D., *Caerleon, Killiney, co. Dublin.*
June 3, 1897.				Turner, Herbert Hall, M.A., B.Sc., Savilian Professor of Astronomy in the University of Oxford. *University Observatory, Oxford.*
June 7, 1877.	'90–91			Turner, Sir William, M.B., D.C.L., President of the General Medical Council, Professor of Anatomy in the University of Edinburgh. 6, *Eton-terrace, Edinburgh; and Athenæum Club,* S.W.

Date of Election.	Member of Council.	Held Office.	Medals.	
June 1, 1899.				Tutton, Alfred E., B.Sc., F.C.S. 17, *Bardwell-road, Oxford.*
June 8, 1871.	'99–			Tylor, Edward Burnett, D.C.L., LL.D., Professor of Anthropology in the University of Oxford. *Museum House, Oxford.*
June 4, 1886.	'93–94			Unwin, W. Cawthorne, B.Sc., Mem. Inst. C.E., Professor of Engineering at the Central Technical College of the City and Guilds of London Institute. *Palace Gate-mansions, 29, Palace Gate, Kensington, W.*
June 7, 1894.				Veley, Victor Herbert, M.A., F.C.S. *University College; and 20, Bradmore-road, Oxford.*
June 7, 1883.				Venn, John, Sc.D. *Sefton House, Hardwick-road, Eastbourne.*
June 4, 1885.	'90–92			Vines, Sydney Howard, M.A., D.Sc., Sherardian Professor of Botany in the University of Oxford. *Headington-hill, Oxford.*
June 7, 1883.				Walker, John James, M.A., 12, *Denning-road, Hampstead, N.W.*
June 1, 1893.			R. Dw.	Wallace, Alfred Russel, LL.D., D.C.L. *Corfe View, Parkstone, Dorset.*
June 2, 1892.				Waller, Augustus Désiré, M.D., Lecturer on Physiology at St. Mary's Hospital Medical School. 16, *Grove End-road, N.W.*
June 9, 1887.	'96–97			Walsingham, Thomas de Grey, Lord, M.A., LL.D., High Steward of the University of Cambridge. *Merton Hall, Thetford, Norfolk.*
June 7, 1888.	'95–96		R.	Ward, Harry Marshall, D.Sc., F.L.S., Professor of Botany in the University of Cambridge. *Botanical Laboratory, New Museums, Cambridge.*
June 4, 1886.				Warington, Robert, M.A., F.C.S., late Sibthorpian Professor of Rural Economy in the University of Oxford. *High Bank, Harpenden, St. Albans.*
June 12, 1884.				Warren, Sir Charles, Lieut.-General R.E., G.C.M.G., K.C.B. 10, *Wellington-crescent, Ramsgate; and Athenæum Club, S.W.*
June 2, 1881.				Watson, Rev. Henry William, D.Sc. *The Rectory, Berkeswell, Coventry.*
June 5, 1890.	'96–98			Weldon, Walter Frank Raphael, M.A., Linacre Professor of Human and Comparative Anatomy in the University of Oxford. *Merton Lea, Oxford.*
June 4, 1886.	'88–89 '95–97			Wharton, Sir William James Lloyd, Rear-Admiral, K.C.B., F.R.G.S., Hydrographer of the Admiralty. *Florys, Prince's-road, Wimbledon-park; and Athenæum Club, S.W.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 9, 1887.				Whitaker, William, B.A., Pres. G.S. *Freda, Campden-road, Croydon.*
June 7, 1888.	'94–95			White, Sir William Henry, K.C.B., LL.D., Assistant Controller and Director of Naval Construction, 39, *Roland Gardens*, S.W.; *and Athenæum Club*, S.W.
June 4, 1886.				Wilde, Henry. *The Hurst, Alderley Edge, Cheshire.*
June 2, 1870.	'99–			Wilks, Sir Samuel, Bart., M.D., LL.D., Consulting Physician to Guy's Hospital. 72, *Grosvenor-street*, W.
June 5, 1862.				Williams, C. Greville, F.C.S., F.I.C. *36, Kenilworth-avenue, Wimbledon*, S.W.
June 7, 1855.	'59–61 '69–71 '73–90	FOR. SEC. '73–89 V.P. '89–90	R.	Williamson, Alexander William, D.C.L., LL.D., Emeritus Prof. of Chemistry in Univ. Coll. Lond. *High Pitfold, Shottermill, Haslemere.*
June 12, 1879.				Williamson, Benjamin, M.A., D.Sc., D.C.L. (Oxon.), Senior Fellow of Trin. Coll., Dublin. *Trinity College, Dublin.*
June 4, 1874.	'89–90			Wilson, Sir Charles William, Major-General, R.E., K.C.B., K.C.M.G., D.C.L. *Athenæum Club*, S.W.
June 7, 1855.				Wilson, George Fergusson, F.C.S., F.L.S. *Heatherbank, Weybridge Heath, Surrey.*
June 4, 1896.				Wilson, William E. *Daramona, Streete, Rathowen.*
June 9, 1898.				Wimshurst, James, M.Inst.E.E., 7, *Crescent-grove, Clapham-common*, S.W.
June 1, 1899.				Windle, Bertram Coghill Allen, M.A., M.D., Sc.D. (Dublin), Professor of Anatomy in Queen's College, Birmingham. 77, *Harborne-road, Birmingham.*
June 13, 1895.				Wolfe Barry, Sir John, K.C.B., V.P. Inst. C.E. 23, *Delahay-street, Westminster*, S.W.
June 12, 1873.				Woodward, Henry, LL.D., F.G.S., Keeper of the Department of Geology, British Museum (Natural History), Cromwell-road, S.W. 129, *Beaufort-street, Chelsea*, S.W.
June 4, 1896.				Woodward, Horace Bolingbroke, F.G.S. 8, *Inglewood-road, West Hampstead*, N.W.; *and Geological Survey Office, Jermyn-street*, W.
June 1, 1893.				Worthington, Arthur Mason, M.A., F.R.A.S., Headmaster and Professor of Physics, Royal Naval Engineering College, Devonport. *Mohuns, Tavistock.*

Date of Election.	Member of Council.	Held Office.	Medals.	
June 4, 1896.				Wynne, William Palmer, D.Sc., Assistant Professor of Chemistry in the Royal College of Science. *Royal College of Science, South Kensington*, S.W.
June 6, 1889.				Yeo, Gerald Francis, M.D., F.R.C.S., Emeritus Professor of Physiology in King's College, London. *Bowden, Totnes, South Devon.*
June 1, 1893.				Young, Sydney, D.Sc., F.C.S., Professor of Chemistry in University College, Bristol. 10, *Windsor-terrace, Clifton, Bristol.*

FOREIGN MEMBERS.

		Elected
	Agassiz, Alexander. *Cambridge, Mass., U.S.A.*	1891.
	Amagat, Emile Hilaire. *École Polytechnique, Paris*	1897.
	Auwers, Georg Friedrich Julius Arthur, *Lindenstrasse*, 91, *Berlin*	1879.
	Baeyer, Adolf von. *Universität, Munich*	1885.
D.	Berthelot, Marcellin. *Secrétariat de l'Institut, Paris*	1877.
D.	Bertrand, Joseph Louis François. *Secrétariat de l'Institut, Paris*	1875.
	Boltzmann, Ludwig. *Vienna*	1899.
CD.	Cannizzaro, Stanislao. *Reale Università, Roma*	1889.
C.	Chauveau, Jean Baptiste Auguste. *Avenue Jules Janin*, 10, *Paris*	1889.
	Cornu, Alfred. *Rue de Grenelle*, 9, *Paris*	1884.
Rm.	Cremona, Luigi. *S. Pietro in Vincoli, Rome*	1879.
	Dohrn, Anton. *Naples*	1899.
	Fischer, Emil. *Berlin*	1899.
	Gaudry, Albert. *Rue des Saints-Pères*, 7 *bis*, *Paris*	1895.
C.	Gegenbaur, Carl. *Leopoldstrasse*, 57, *Heidelberg*	1884.
	Gibbs, J. Willard, *Yale College, New Haven, Conn.*	1897.
	Heim, Albert. *Hochschule, Zürich*	1896.
	Hermite, Charles. *Rue de la Sorbonne*, 2, *Paris*	1873.
	Hoff, J. H. van't. *Universität, Berlin*	1897.
Rm.	Janssen, Pierre Jules César. *Observatoire de Meudon, Paris*	1875.
	Klein, Felix. *Weender Chaussee*, 6, *Göttingen*	1885.
	Koch, Dr. Robert. *Universität, Berlin*	1897.
	Kohlrausch, Friedrich. *Physikalisch-Technische Reichsanstalt, Berlin*	1895.
C.	Kölliker, Albert von. *Universität, Würzburg*	1860.
	Kowalewski, Alexsandr. *Odessa, Russia*	1885.
	Kühne, Willy. *Universität, Heidelberg*	1892.

		Elected.
	Lacaze-Duthiers, Henri de. *Faculté des Sciences, Paris*.....	1897.
	Langley, Samuel P. *Smithsonian Institution, Washington, U.S.A.*.....	1895.
	Lippmann, Gabriel. *Faculté des Sciences à la Sorbonne, Paris*..	1896.
	Mascart, Éleuthère Élie Nicolas. *Rue de l'Université*, 176, *Paris*	1892.
D.	Mendeleeff, Dmitri Ivanovitch. 19, *Zabalkansky, St. Petersburg*	1892.
	Metschnikoff, Elias. *Institut Pasteur, Paris*	1895.
	Mittag-Leffler, Gösta. *Högskolan, Stockholm*	1896.
	Neumayer, Georg. *Hamburg*	1899.
C.	Newcomb, Simon. 1620, *P Street, Washington, U.S.A.*	1877.
	Pfeffer, Wilhelm. *Universität, Leipzig*.....	1897.
›	Pflüger, Eduard Friedrich Wilhelm. *Universität, Bonn, Germany*	1888.
›	Poincaré, Henri. *École Polytechnique, Paris*	1894.
	Quincke, Georg Hermann. *Friedrichsbau, Heidelberg*	1879.
	Rowland, Henry A. *Johns Hopkins University, Baltimore, U.S.A.*	1889.
	Schiaparelli, Giovanni. *R. Osservatorio Astronomico di Brera, Milan*	1896.
	Strasburger, Eduard. *Universität, Bonn*.....	1891.
	Struve, Otto Wilhelm. *Fahnstrasse*, 8, *Carlsruhe, Germany* ...	1873.
	Suess, Eduard. *Geologisches Museum, Vienna*	1894.
Rm.	Tacchini, Pietro. *Ufficio Meteorologico Centrale, Roma*.....	1891.
	Treub, Melchior. *Buitenzorg*	1899.
C.	Virchow, Rudolf. *Universität, Berlin*	1884.
D.	Wislicenus, Johannes. *Universität, Leipzig*.....	1897.
	Zirkel, Ferdinand. *Universität, Leipzig*	1897.

COMMITTEES, 1900.

The President and Officers are *ex officio* members of all Committees, the Scientific Relief Committee and Sectional Committees excepted, and in the case of all Committees (excepting the Scientific Relief Committee, the Joint Permanent Eclipse Committee, and the Sectional Committees) each Committee has power to add to its number; provided that any persons so admitted, not being Fellows of the Royal Society, shall be called "accessory members."

SECTIONAL COMMITTEES.

1. Mathematics Committee :—

(Two to retire each year.)

Chairman—Prof. Forsyth.

	To serve.		
Prof. Hill	1 year.	Retires Dec.,	1900.
Mr. Love	1 „	„ „	„
Prof. Burnside	2 years.	„ „	1901.
„ Forsyth.....	2 „	„ „	„
Dr. Routh	3 „	„ „	1902.
Prof. Lamb.....	3 „	„ „	„

2. Physics and Chemistry Committee :—

(Four to retire each year.)

Chairman—Prof. G. C. Foster.

	To serve.		
Prof. G. C. Foster	1 year.	Retires Dec.,	1900.
Dr. Müller	1 „	„ „	„
Prof. Perry	1 „	„ „	„
„ Ramsay.....	1 „	„ „	„
Mr. Shelford Bidwell.....	2 years.	„ „	1901.
Mr. Boys	2 „	„ „	„
Prof. Meldola.....	2 „	„ „	„
Sir G. G. Stokes	2 „	„ „	„
Mr. Dunstan	3 „	„ „	1902.
Prof. Fleming	3 „	„ „	„
Sir W. Huggins.....	3 „	„ „	„
Prof. Lodge	3 „	„ „	„

3. Geology Committee :—

(Three to retire each year.)

Chairman—Dr. Blanford.

	To serve.			
Mr. J. J. H. Teall.....	1 year.	Retires	Dec.,	1900.
Dr. H. Woodward.....	1 „	„	„	„
Sir J. Murray.....	1 „	„	„	„
Dr. Blanford	2 years.	„	„	1901.
Gen. McMahon	2 „	„	„	„
Adm. Sir W. J. L. Wharton	2 „	„	„	„
Dr. Hinde	3 „	„	„	1902.
Prof. Judd.....	3 „	„	„	„
Adm. Sir G. S. Nares ...	3 „	„	„	„

4. Botany Committee :—

(Three to retire each year.)

Chairman—Dr. D. H. Scott.

	To serve.			
Prof. Ward.....	1 year.	Retires	Dec.,	1900.
Mr. C. B. Clarke	1 „	„	„	„
Dr. D. H. Scott.....	1 „	„	„	„
Mr. Baker	2 years.	„	„	1901.
Mr. Gardiner.....	2 „	„	„	„
Prof. J. R. Green	2 „	„	„	„
Mr. Carruthers	3 „	„	„	1902.
Mr. F. Darwin	3 „	„	„	„
Prof. Vines.....	3 „	„	„	„

5. Zoology Committee :—

(Three to retire each year.)

Chairman—Prof. Herdman.

	To serve.			
Prof. Hickson.....	1 year.	Retires	Dec.,	1900.
Dr. Sclater	1 „	„	„	„
Mr. Sedgwick.....	1 „	„	„	„
Dr. Gadow	2 years.	„	„	1901.
Prof. Howes	2 „	„	„	„
Dr. Sharp	2 „	„	„	„
Mr. Boulenger	3 „	„	„	1902.
Prof. Herdman	3 „	„	„	„
„ Poulton.....	3 „	„	„	„

6. Physiology Committee :—

(Four to retire each year.)

Chairman—Prof. Halliburton.

	To serve.			
Dr. Pye-Smith	1 year.	Retires	Dec.,	1900.
Prof. McKendrick	1 „	„	„	„
„ Sherrington	1 „	„	„	„
Dr. Lea	1 „	„	„	„
Sir J. Crichton Browne...	2 years.	„	„	1901.
Dr. Gaskell	2 „	„	„	„
Prof. Halliburton	2 „	„	„	„
Dr. Sidney Martin.....	2 „	„	„	„
Prof. Bradford	3 „	„	„	1902.
Dr. Haldane	3 „	„	„	„
„ Mott	3 „	„	„	„
Prof. Starling.....	3 „	„	„	„

STANDING AND OCCASIONAL COMMITTEES.

Library Committee.

Vice-Chairman—Prof. Carey Foster.

Prof. W. Grylls Adams, Prof. Bonney, Mr. Christie, Prof. Carey Foster, Dr. J. W. L. Glaisher, Prof. McLeod, Dr. H. Müller, Prof. A. Newton, Prof. D. Oliver, Prof. Schäfer, Dr. Sclater, Prof. S. P. Thompson, and Lord Walsingham, with power to add to their number, and with power to order books to an amount not exceeding £250, and to expend a sum not exceeding £150 in binding books belonging to the Society.

Soirée Committee.

Vice-Chairman—Sir W. Roberts-Austen.

Mr. Boys, Prof. Callendar, Sir W. Crookes, Sir J. Evans, Mr. F. Darwin, Mr. W. Gardiner, Prof. Lankester, Sir J. N. Lockyer, Dr. Mond, Dr. H. Müller, Prof. Perry, Prof. Poulton, Sir W. H. Preece, Sir W. C. Roberts-Austen, Dr. Sclater, and Dr. R. H. Scott, of whom three, to be determined by least attendance, retire annually.

House Committee.

Vice-Chairman—The Treasurer.

Prof. Ayrton, Prof. Ewing, Sir W. H. Preece, and Prof. S. P. Thompson (with the Treasurer as Vice-Chairman).

CATALOGUE OF SCIENTIFIC PAPERS COMMITTEE.

Vice-Chairman—Sir John Evans.

Prof. Armstrong, Sir John Evans, Prof. Judd, Dr. Klein, Sir J. N. Lockyer, Prof. McKendrick, Mr. McLachlan, Prof. McLeod, Dr. Mond, Prof. A. Newton, Sir W. H. Preece, Sir W. C. Roberts-Austen, Dr. Routh, Dr. D. H. Scott, and Prof. Tilden.

"CHALLENGER" COMMITTEE.

Vice-Chairman—Sir J. D. Hooker.

Sir J. D. Hooker, Prof. Lankester, and Sir W. T. Thiselton-Dyer.

GUNNING FUND (WATER RESEARCH) COMMITTEE.

Vice-Chairman—Sir J. Burdon-Sanderson.

Dr. H. Müller, Sir J. Burdon-Sanderson, Prof. S. P. Thompson, and Prof. Vines.

SCIENTIFIC RELIEF COMMITTEE.

Chairman—Dr. W. J. Russell.

Mr. J. G. Baker, Sir T. L. Brunton, Mr. Christie, Sir A. Geikie, Major MacMahon, Dr. Mond, Prof. A. Newton, Dr. W. J. Russell, Prof. Schäfer, and Dr. R. H. Scott.

INTERNATIONAL CATALOGUE COMMITTEE.

Vice-Chairman—Prof. Armstrong.

Prof. Armstrong, Dr. W. T. Blanford, Mr. H. T. Brown, Mr. Christie, Prof. Forsyth, Prof. Halliburton, Mr. B. Daydon Jackson, Prof. Lapworth, Sir J. N. Lockyer, Mr. Love, Prof. McLeod, Major MacMahon, Prof. Miers, Dr. Mond, Dr. D. H. Scott, Mr. Sharp, Gen. Sir R. Strachey, Mr. G. J. Symons, Mr. Teall, Prof. Weldon, and Adm. Sir W. J. L. Wharton.

JOINT PERMANENT ECLIPSE COMMITTEE.

(On the part of the Royal Society.)

Sir W. de W. Abney, Mr. Christie, Dr. Common, Sir W. Huggins, Sir J. N. Lockyer, Major MacMahon, Prof. Schuster, Dr. G. J. Stoney, Gen. Tennant, Dr. Thorpe, and Adm. Sir W. J. L. Wharton.

CORAL REEF COMMITTEE.

Vice-Chairman—Prof. Bonney.

Prof. Armstrong, Prof. Bonney, Sir W. Crookes, Mr. F. Darwin, Sir J. Evans, Capt. A. M. Field, Sir A. Geikie, Prof. Judd, Prof.

Lankester, Prof. Lapworth, Sir J. Murray, Prof. Sollas, Dr. Sorby, Mr. Teall, Prof. W. W. Watts, Adm. Sir W. J. L. Wharton, and Sir J. Wolfe Barry.

DELTA BORING COMMITTEE.

Vice-Chairman—Prof. Judd.

Sir B. Baker, Dr. W. T. Blanford, Prof. Bonney, Dr. Le Neve Foster, Sir A. Geikie, Prof. Judd, and Prof. Lapworth.

TSETSE FLY COMMITTEE.

Prof. Bradford, Sir J. Kirk, Prof. Lankester, and Sir J. Burdon-Sanderson, with Dr. Durham as accessory member.

EVOLUTION COMMITTEE.

Vice-Chairman—Mr. F. Galton.

Mr. W. Bateson, Mr. Burbury, Mr. F. Darwin, Mr. F. Galton, Mr. F. D. Godman, Prof. Lankester, Mr. E. J. Lowe, Prof. Macalister, Dr. Masters, Prof. Meldola, Prof. Karl Pearson, Prof. Poulton, Sir W. T. Thiselton-Dyer, and Prof. Weldon, with Sir E. Clarke and Mr. W. Heape as accessory members.

GOVERNMENT GRANT REVIEW COMMITTEE.

Vice-Chairman—Dr. H. Müller.

Prof. Bonney, Prof. Halliburton, Dr. H. Müller, Mr. W. D. Niven, Prof. Reinold, Dr. Russell, and Dr. D. H. Scott.

OBSERVATORIES COMMITTEE.

Vice-Chairman—Astronomer Royal.

The Astronomer Royal, the President of the Royal Astronomical Society, Sir W. de W. Abney, Prof. G. H. Darwin, Sir W. Huggins, Sir J. N. Lockyer, Sir G. G. Stokes, and Gen. Sir R. Strachey.

INTERNATIONAL FLOATING OBSERVATORY COMMITTEE.

Vice-Chairman—Sir A. Geikie.

Sir A. Geikie, Prof. Herdman, Prof. Meldola, Mr. G. Murray, and Prof. Weldon.

MALARIA COMMITTEE.

Prof. Clifford Allbutt, Sir J. Kirk, Prof. E. R. Lankester, and Sir J. Burdon-Sanderson, with Mr. C. P. Lucas and Dr. Manson of the Colonial Office.

FINANCE COMMITTEE.

Vice-Chairman—The Treasurer.

Sir R. Giffen, Dr. Mond, Dr. Müller, Dr. R. H. Scott, and the Treasurer.

INDIAN GOVERNMENT ADVISORY COMMITTEE.

Vice-Chairman—Gen. Sir R. Strachey.

Dr. Blanford, Mr. H. T. Brown, Gen. Sir R. Strachey, Sir W. T. Thiselton-Dyer, and Prof. H. M. Ward.

JOINT ANTARCTIC COMMITTEE.

(On the part of the Royal Society.)

The President, The Treasurer, Sir M. Foster, Mr. A. Buchan, Mr. J. Y. Buchanan, Capt. Creak, Sir J. Evans, Sir A. Geikie, Prof. Herdman, Sir J. D. Hooker, Sir J. Murray, Prof. Poulton, Prof. Rücker, Mr. P. L. Sclater, Capt. Tizard, and Adm. Sir W. J. L. Wharton.

PRIVILEGED CLASS COMMITTEE.

Prof. Dewar, Prof. Poulton, and Dr. Russell.

STATUTES OF THE ROYAL SOCIETY.

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CHAPTER I.

Of the Election and Admission of Fellows.

I. No person shall be proposed, elected, or admitted a Fellow of the Society on the day of the Anniversary Meeting for electing the Council and Officers.

II. Every Fellow, previously to his proposing a person as a Candidate for Election, shall inform him of the Obligation to be subscribed, of the sum to be paid for admission money, and of the payments to be made to the Society, before he can be admitted a Fellow.

III. Every such Candidate shall be proposed and recommended by a certificate in writing signed by six or more Fellows, of whom three at least shall certify their recommendation from personal knowledge. The certificate shall specify the name, rank, profession, qualifications, and usual place of residence of the Candidate; and being delivered to one of the Secretaries, or to the Assistant Secretary,

shall be registered, with the date of delivery, in a book to be kept for the purpose, and read at the next ordinary meeting; and, if so ordered, shall be suspended in some convenient place in the apartments of the Society until the day of election.

IV. Any one of Her Majesty's subjects who is a Prince of the Blood Royal may, nevertheless, be proposed at one of the Ordinary Meetings of the Society by any Fellow, and may be put to the vote for Election on the same day, provided public notice of such proposition shall have been given by the proposer at the preceding Meeting of the Society.

Any Member of Her Majesty's Privy Council may be proposed at any Ordinary Meeting by means of a certificate prepared in accordance with Statute III of this Chapter, no distinction, however, being made between personal and general knowledge, and the fact of the Candidate being a Member of the Privy Council being alone stated as the qualification. Such certificate, on being allowed by the Society, shall be suspended in some convenient place in the apartments of the Society until the day on which a ballot is taken upon it. The date proposed for the ballot, which shall not be earlier than the third Ordinary Meeting after that at which the certificate is read, shall be announced at the head of the certificate.

V. At the first Ordinary Meeting of the Society in March, the names of all Candidates proposed subsequently to the first Meeting in March of the preceding year, including those whose certificates have been resuspended as hereinafter provided, shall be announced by the Secretary from a list arranged in alphabetical order, without reference to the dates of the certificates of the Candidates; and these certificates shall remain suspended until the day of Election.

VI. In the first week in April, a list shall be printed, containing the names of all the Candidates so announced at the first Meeting in March, arranged in alphabetical order, without reference to the dates of the certificates, together with the names of the Fellows by whom each candidate is proposed and recommended; and a copy of such list shall immediately thereafter be sent to every Ordinary Fellow.

VII. The Council shall select by ballot from such printed list of Candidates a number not exceeding fifteen, to be recommended to the Society for Election; but no such selection by the Council shall be valid unless eleven Members at least be present and vote, a majority deciding, or in the event of equality the President having a second or casting vote.

VIII. At the first Ordinary Meeting of the Society in May, the

President shall read from the Chair the names of the Candidates whom the Council have selected as most eligible, arranged in alphabetical order; and after such Meeting, a circular letter shall be forthwith sent to every Fellow, naming the day and hour of Election, and inclosing a printed list of the selected Candidates, with space for such alterations as any Fellow may determine to make in pursuance of Statute X of this Chapter.

IX. The election of Ordinary Fellows not included in the privileged classes referred to in Statute IV of this Chapter, shall take place on the first Thursday of June; unless the Council shall alter the day of Election to any other day in the month of June, in which case due notice of such alteration shall be given to every Ordinary Fellow.

X. On the day of Election two Scrutators shall be nominated by the President, with the approbation of the Society, to assist the Secretaries in examining the lists; and each Fellow present and voting, shall deliver to one of the Secretaries or Scrutators one of the printed lists mentioned in Statute VIII of this Chapter, having erased the name of any Candidate or Candidates for whom he does not vote, and, if he shall have thought fit, having substituted or added the name of any other Candidate or Candidates contained in the printed list sent in pursuance of Statute VI of this Chapter.

XI. One of the Secretaries shall take down the names of the Fellows who vote, and the Scrutators, after examining the lists with the Secretaries, shall report to the President the names of the Candidates who shall have been duly elected in compliance with the Charters, and the President shall announce those names from the Chair.

XII. Any Candidate announced at the first Ordinary Meeting of the Society in March, as aforesaid, who shall not have been elected, shall, if his proposers, or any one of them, so request in writing, continue a candidate; his name shall be placed in alphabetical order with those of the new Candidates to be announced in March following, and his certificate shall be suspended along with those of the new Candidates. Any additional qualifications of such a Candidate may be set forth in a supplementary certificate to be signed by not fewer than six Fellows.

XIII. Every person who is elected a Fellow shall appear for his admission on or before the fourth Ordinary Meeting of the Society after the day of his Election, or within such further time as shall, for some sufficient cause, be granted by the Council; otherwise his election shall be void.

XIV. The admission of any Fellow into the Society shall be at some Ordinary Meeting, in manner and form following, he having first made the payments required by the Statutes. Immediately after the reading of the Minutes has been concluded, he shall subscribe the Obligation in the Charter-book, and be introduced to the President, who, taking him by the hand, shall say these words: *I do, by the authority and in the name of the Royal Society of London, for improving natural knowledge, admit you a Fellow thereof.*

XV. The Election, the payments made previous to admission, and the admission of every person into the Society, with the time thereof, shall be recorded in the Journal-book.

XVI. No person shall be deemed a Fellow of the Society until he has made the payments required by the Statutes: nor shall he be entitled to vote at any Election or Meeting of the Society until he shall have been admitted in the manner and form above specified.

XVII. Persons may be elected into the Society, under the title of Foreign Members, who are neither natives nor inhabitants of Her Majesty's dominions, and shall be exempted from the operation of Chapters II and III of these Statutes; they shall be selected from among men of the greatest eminence for their scientific discoveries and attainments.

XVIII. The Council shall from time to time, as they shall see fit, put in nomination persons for Election as Foreign Members, not exceeding, with those already elected, the number of fifty.

XIX. A book shall be kept in which Members of the Council may enter the names of those men of science whom they suggest as Foreign Members; each entry shall be signed by the proposer and be accompanied by a short statement of the principal grounds on which the suggestion is made, and shall be valid for three years only.

XX. When vacancies are to be filled up, a list of the persons so entered shall be sent to each Member of the Council, together with notice of the Meeting at which the list will be considered. At the Meeting thus appointed further entries may be made, and the claims of those men of science whose names have been duly entered in the book shall be considered, and a selection of names shall be made, from among which the Council, at a subsequent Meeting to be then appointed, may make nominations to the Society.

XXI. At the second Meeting the selection of the Candidates to be

nominated shall be by ballot; when, if two-thirds of the Members of the Council present be in favour of the nomination of any Candidate, his name shall be proposed at the next Ordinary Meeting of the Society, and shall be put to the vote at the following Ordinary Meeting.

CHAPTER II.

Of the Obligation to be Subscribed.

EVERY person elected a Fellow of the Society shall, before his admission, subscribe the Obligation in the following words:—

We who have hereunto subscribed, do hereby promise each for himself, that we will endeavour to promote the good of the Royal Society of London, for improving natural knowledge, and to pursue the ends for which the same was founded; that we will be present at the Meetings of the Society, as often as conveniently we can, especially at the Anniversary Elections, and upon extraordinary occasions; and that we will observe the Statutes and Orders of the said Society. Provided, that whensoever any of us shall signify to the President under his hand, that he desireth to withdraw from the Society, he shall be free from this Obligation for the future.

And if any person elected shall refuse to subscribe the said Obligation, the election of that person shall be void.

CHAPTER III.

Of the Payments to be made by the Fellows to the Society.

I. EVERY person elected a Fellow of the Society shall, before he is admitted, pay the sum of *ten pounds* for admission money, the sum of *four pounds* for the year of his election, and the same sum annually in advance so long as he shall continue a Fellow of the Society. And if any such person shall refuse or fail to pay the said sums, he shall not be admitted, and his Election shall be void: except the said sums be remitted in whole, or in part, by special order of the Council. Provided always that, except in the case of Fellows elected under Statute IV of Chapter I, the admission fee of each Fellow shall be paid out of the Fee Reduction Fund, and shall not be demanded of the Fellow; and that, except in the case of Fellows elected under Statute IV of Chapter I, and Fellows elected before January, 1879, *one pound* of the annual contribution shall be paid out of the Fee Reduction Fund.

II. All who have or may become Fellows of the Society may at any time compound for their annual payments, by paying at once the sum of *sixty pounds*.

III. All Annual Contributions shall be considered to be due on the 25th day of March in each year. Every Fellow of the Society liable to an Annual Payment shall (previously to the 25th day of March in every year) bring or send the same to the Treasurer or the Assistant Secretary. And if any such Fellow, after notice sent by post to his usual address, in May, and again in September, shall fail to pay the same before the first day of October in each year, his name shall be suspended in the public Meeting-room of the Society as being in arrear, and shall continue so suspended until the sum due be paid. And if any such Fellow shall fail to pay his subscription on or before the first day of November in each year, no satisfactory reason having been assigned to the President and Council for such non-payment, he shall cease to be a Fellow of the Society. Provided, nevertheless, that on a solicitation for readmission being addressed to the President and Council by an individual so circumstanced, within the space of one year following St. Andrew's Day, the case of the individual so soliciting shall be stated by the President from the Chair, at one of the Ordinary Meetings of the Society, and the question of his readmission be put to the vote at the next Ordinary Meeting of the Society.

CHAPTER IV.

Of the Death or Recess of any Fellow.

THE Death or Recess of any Fellow of the Society shall be recorded in the Journal-book of the Society, and the names of such persons announced from the Chair, at the Anniversary Meeting for electing the Council and Officers.

CHAPTER V.

Of the Causes and Form of Ejection.

I. IF any Fellow of the Society shall contemptuously or contumaciously disobey the Statutes or Orders of the Society or Council; or shall, by speaking, writing, or printing, publicly defame the Society; or advisedly, maliciously, or dishonestly do anything to the damage, detriment, or dishonour thereof, he shall be ejected out of the Society.

II. Whensoever there shall appear to be cause for the ejection of any Fellow out of the Society, the subject shall be laid before the Council; and if a majority of the Council shall, after due deliberation, determine by ballot to propose to the Society the ejection of the said Fellow, the President shall in that case, at some Ordinary Meeting of

the Society, announce from the Chair such determination of the Council; and at the Ordinary Meeting next after that at which the said announcement has been made, the Society shall proceed to determine the question; and on its appearing that two-thirds of the Members present have voted for the ejection of the said Fellow, the President shall proceed to cancel his name in the Register, and at the same time pronounce him ejected in these words:—

I do, by the authority and in the name of the Royal Society of London, for improving natural knowledge, declare A. B. to be now ejected, and no longer a Fellow thereof.

And the ejection of every such person shall be then recorded in the Journal-book of the Society; and his name, as ejected, be also read at the next Anniversary Meeting for Elections.

CHAPTER VI.

Of the Election of the Council and Officers.

I. At the two Ordinary Meetings of the Society next preceding the day of the Anniversary Election, the President shall give notice of the said Election; and declare how much it imports the good of the Society, that such persons may be chosen into the Council, as are most likely to attend the Meetings and business of the Council, out of whom there may be made the best choice of a President and other Officers.

II. Every Fellow of the Society whose residence is known, shall have notice of the Anniversary Meeting for electing the Council and Officers for the year ensuing, by particular summons, which summons shall be sent to the place of residence of such Fellow, a week at the least before the day of Meeting, and shall be to this effect:—

*These are to give notice, that on the * day of the Council and Officers of the* Royal Society *are to be elected for the year ensuing; at which Election your presence is expected, at of the clock in the precisely.*

III. The Council for the ensuing year, out of which shall be chosen the President, Treasurer, Principal Secretaries, and Foreign Secretary, shall consist of eleven Members of the existing Council, and of ten Fellows who are not Members of the existing Council.

IV. The President and Council shall, previous to the Anniversary Meeting, nominate, by ballot, eleven Members of the existing Council, and also ten Fellows, not Members of the existing Council, whom they recommend to the Society for Election into the Council for the

ensuing year. The President and Council shall, also, in like manner, nominate by ballot, out of the proposed Council, the persons whom they recommend to the Society for election to the offices of President, Treasurer, Principal Secretaries, and Foreign Secretary for the ensuing year.

V. At the Ordinary Meeting of the Society preceding the Anniversary Meeting, the names of such persons so recommended for election as Council and Officers for the ensuing year shall be announced from the Chair.

VI. Lists, with the names of the Fellows recommended by the President and Council, and having a blank column opposite for such alterations as any Fellow may wish to make, shall be prepared for the use of the Fellows, one week before the day of Election.

VII. Two Scrutators shall be nominated by the President, with the approbation of the Society, to assist the Secretaries in examining the lists.

VIII. Each Fellow voting, shall deliver his list to one of the Secretaries or Scrutators; and the name of each Fellow who shall so deliver in his list shall be noted by one of the Secretaries.

IX. The Scrutators, after examining the lists with the Secretaries, shall report to the Society the names of those having the majority of votes for composing the Council, and filling the offices of President, Treasurer, Principal Secretaries, and Foreign Secretary; the names of which persons shall then be announced from the Chair.

X. For electing any Member of the Council, or any Officer to be elected by the Society, upon such vacancies as shall happen in the intervals of the Anniversary Elections, the summons for such Election, and the proceedings in it, shall be after the same manner as is directed for the Anniversary Election.

XI. Upon any vacancy of the President's place, occurring in the intervals of the Anniversary Elections, the Treasurer, or, in his absence, one of the Secretaries, shall cause the Council to be summoned for the Election of a new President: and the Council meeting thereupon in the usual place, or any eleven or more of them, shall proceed to the said Election, and not separate until the major part of them shall have agreed upon a new President.

CHAPTER VII.

Of the President.

I. The business of the President shall be to preside at all the meetings, and regulate all the debates, of the Society, Council, and Committees; to state and put questions both in the affirmative and negative, according to the sense and intention of the meetings; to call for reports and accounts from Committees, and others; to check irregularities, and to keep all persons to order; to summon all Meetings of the Council, and Committee of Papers; and to execute, or see to the execution of, the Statutes of the Society.

II. The President shall take precedence of every Fellow of the Society, at their ordinary place of meeting; and also in all other places, where any number of the Fellows meet as a Society, Council, or Committee.

III. In the absence of the President, one of the Vice-Presidents shall act as his deputy, and may do, in the absence of the President, the same acts as the President himself could do if present.

CHAPTER VIII.

Of the Treasurer and his Accounts.

I. The Treasurer, or some person appointed by him, shall receive for the use of the Society, all sums of money due or payable to the Society; and shall pay and disburse all sums due from or payable by the Society; and shall keep particular Accounts of all such receipts and payments.

II. Every sum of money payable on account of the Society, exceeding Ten Pounds, shall be paid only by order of the Council; but payments for rates or taxes, to any amount, may be made by the Treasurer, without any specific order of the Council for that purpose.

III. All sums of money, which there shall not be present occasion for expending, or otherwise disposing of to the use of the Society, shall be laid out in such Government or other securities as shall be approved of and directed by the Council.

IV. The Treasurer shall keep a yearly account of all such Fellows of the Society as pay the sum appointed as the composition in lieu of annual payments; and also of those who make the annual payments: and in this account shall be noted the times up to which the annual payments have been made, and the arrears due from each Fellow.

V. The Treasurer shall also keep a book of Cheque Receipts for annual payments, to be filled up with the name of the Fellow paying, the sum paid, and the time for which payment is made; these Receipts to be signed by the Treasurer, or by the Assistant Secretary receiving the money on the Treasurer's behalf, who, upon the delivery of the Receipt to the Fellow paying, is to enter upon that part of the Cheque which is left in the Book, the above particulars, and also the day of payment.

VI. The Treasurer shall demand, or cause to be demanded, all arrears of annual payments, as soon as convenient after the first day of May.

VII. The Accounts of the Treasurer shall be audited annually, a short time preceding the Anniversary Elections, by a Committee consisting of three Members of the Council, of whom the President or one of the Secretaries to be one; and of three Fellows of the Society not Members of the Council, who are to be nominated by the President, with the consent of the major part of the Fellows present, given by ballot at one of the three next preceding weekly meetings; any one or more of the said three Members of the Council, together with any one or more of the said three Fellows, shall be a Quorum of the said Committee: the Members of the said Committee who are of the Council shall make their Report to the Council held next after such audit, on or before the Anniversary Election; and the Members of the said Committee who are not of the Council shall make their Report to the Society, upon the Meeting next before the Anniversary Election, or on the day of the said Election.

VIII. The Treasurer shall have the charge of the Title Deeds of the Society's Estates, the Policies of Insurance, and Securities.

IX. As soon after the Audit as may be, and before the Anniversary Meeting, the Treasurer shall cause an abstract of the Society's Accounts of the preceding year to be printed for the use of the Fellows.

CHAPTER IX.

Of the Secretaries.

I. The Secretaries, or one of them, shall have inspection over the Assistant Secretary; and shall give the Orders and Directions concerning the entering and writing of all minutes or matters in the Journal-books of the Society or Council, or any other Books of the Society; and also concerning any orders or other writings for the use and service of the Society.

II. The Secretaries, or one of them, shall attend all meetings of the Society, Council, and Committee of Papers; where, when the President has taken the Chair, one of the Secretaries shall read the minutes, orders, and entries of the preceding meeting; and shall afterwards take minutes of the business and orders of the present meeting, to be entered by the Assistant Secretary in the respective books to which they relate.

III. At the meetings of the Society, Lists of the Presents made from time to time to the Society shall be laid on the Table, by one of the Secretaries, for the inspection of the Fellows; and the thanks of the Society to the Donors shall be proposed from the Chair previously to the reading of the first Paper. One of the Secretaries shall give notice of any Candidate who stands proposed for election into the Society at that Meeting; and the Secretaries shall read Letters and Papers presented to the Society, in such manner as the President shall direct.

IV. The Secretaries shall draw up all letters to be written to any persons in the name of the Society or Council (to be read and approved of in some meeting of either respectively), except, for some particular cause or consideration, some other person be appointed by the Society or Council to draw up any such letter. They shall likewise have the charge (under the direction of the Committee of Papers) of printing the *Philosophical Transactions*, the *Proceedings*, and other Publications of the Society.

V. The letters relating to the business of the Society, received during each Session, shall be arranged and kept in the apartments of the Society.

VI. The duty of the Secretary for Foreign Correspondence shall be to receive and answer all letters from foreign parts relating to the business of the Society, to return thanks for Presents from Foreigners made to the Society, and to forward to persons elected Foreign Members the Diplomas certifying their election into the Society.

CHAPTER X.

Of the Assistant Secretary.

I. The person who shall be chosen to the office of Assistant Secretary, shall either not be a Fellow of the Society; or, if a Fellow, shall cease to be so upon his election to and acceptance of that office.

II. The appointment of a person to the office of Assistant Secretary shall be by the Council, to whom the Officer so appointed shall give security, at the discretion of the Council; and he shall reside in the Society's House.

III. The Assistant Secretary shall be paid for his services according to the determination of the Council; and shall not, besides such payments, receive any perquisite or profit whatsoever without the express permission of the President and Council. He shall be subject to such Rules and Orders as shall from time to time be made or given by the President and Council; and he shall constantly be in attendance during all meetings of the Society, Council, and Committees.

IV. He shall enter all the Minutes in the several Journal-books, and make an Index to every such book: he shall lay before every Council their fair Minute-book: and before every Committee of Papers, the Society's Journal-book, to show that the several entries are fairly made: and he shall have the care of the writing of all Summonses of the Society, Council, and Committees.

V. He shall, under the direction of the Secretaries, have the charge and custody of the Charter-book, Statute-book, Journal-books of the Society and Council, Register-books, and Letter-books, as also of all Papers and Writings belonging to the Society; all which shall be kept in the House of the Society, that they may be in readiness to be produced at any meetings of the Society or Council, as the case may require, or as shall be ordered by the Society, Council, or President.

VI. He shall not suffer any person, not being a Fellow of the Society, to read any Journal-book, Record, or Writing, or any part thereof, belonging to the Society; nor give any copy thereof, nor in any way communicate anything contained therein, to any such person.

VII. He shall follow the directions which may be given him from time to time by the Treasurer in respect of that part of his duties which relates to the Accounts or Cash Transactions of the Society. He shall enter in a book, to be provided by the Treasurer, all such sums as he may receive on account of the Society at the instant of receiving such sums; and for these sums, so entered by him, he shall be answerable, until he shall have paid them to the Treasurer.

VIII. He shall attend the Library at such hours as shall be appointed for him for the accommodation of such Fellows of the Society

as shall come to read the printed books or manuscripts, and of any other person who shall be introduced by a Fellow, either personally or by letter.

IX. He shall mark with the stamp of the Society all books accepted or bought by the Society.

CHAPTER XI.

Of the Meetings of the Society.

I. The Session of the Society shall commence on the third Thursday in November, and end on the third Thursday in June.

II. The Ordinary Meetings of the Society shall be on Thursdays weekly (excepting Christmas, Passion, Easter, and Whitsun weeks, and such other weeks at Christmas and Easter, in each year, as the Council may in the preceding year determine, and also Ascension Day), and shall begin at half-past Four o'clock in the Afternoon precisely.

III. No stranger shall be permitted to be present during the Meeting, unless by invitation of the President, or by his leave or order upon the recommendation of some Fellow.

IV. The business of the Society in their Ordinary Meetings shall be to order, take account, consider, and discourse of philosophical experiments and observations; to read, hear, and discourse upon letters, reports, and other papers containing philosophical matters; as also to view, and discourse upon, rarities of nature and art: and thereupon to consider, what may be deduced from them, or any of them; and how far they, or any of them, may be improved for use or discovery.*

V. No letter, report, or other paper shall be read at any Ordinary Meeting unless it be communicated by a Fellow or Foreign Member; and it shall be the duty of each Fellow or Foreign Member to satisfy himself that any letter, report, or other paper which he may communicate, is suitable to be read before the Society.

VI. The conduct of the Ordinary Meetings shall be in accordance with the Standing Orders determined from time to time by the President and Council, provided always that at the Ordinary Meetings nothing relating to Statutes or management of the Society shall be brought forward or discussed.

* This is the wording of the Statute as given in the Statutes of 1663.

VII. The Anniversary Meeting for the election of the Council and Officers, and the Annual Meeting for the election of Fellows, shall take place at an hour to be determined by the Council.

CHAPTER XII.

Of Special General Meetings of the Society.

I. The President or Council may at any time call a Special General Meeting of the Society when it may appear to them to be necessary.

II. Any six Fellows may, by notice in writing, signed by them, and delivered to one of the Secretaries at an Ordinary Meeting of the Society, require a Special General Meeting of the Society to be convened, for the purpose of considering and determining on the matters specified in such requisition, and the Council shall, within one week after such requisition shall have been so delivered, appoint a day for a Special General Meeting accordingly.

III. One week's notice of any Special General Meeting shall be given to each Fellow resident in the United Kingdom, and such notice shall state the object of such Meeting.

IV. At such Meeting no business shall be brought forward except what shall have been so notified.

CHAPTER XIII.

Of the Publication of Papers.

I. The Members of the Council for the time being shall constitute and be a standing Committee, to be called the Committee of Papers, to whom the consideration of the acceptance, reading, and publication of all papers communicated to the Society shall be referred, and who shall execute their powers in accordance with Standing Orders determined from time to time by the President and Council.

II. The Committee of Papers shall meet at such times as shall be appointed by the President; due and sufficient notice of such meeting having been previously sent to every Member of the Committee.

The publication of papers communicated to the Society, and of such other matters as the President and Council may judge fit to publish, shall take place under Standing Orders determined from time to time by the President and Council, but always in such a way that a proper portion of them shall from time to time be printed and published under the title of the 'Philosophical Transactions of the

Royal Society of London,' and another proper portion under the title of the 'Proceedings of the Royal Society of London,' provided always that the President and Council shall have power to publish either papers or other matter in such form and under such conditions as they may from time to time determine.

III. At a meeting of the said Committee no less number than seven of the Members (of which number the President, or, in his absence, a Vice-President, shall always be one) shall be a quorum.

IV. The decisions of the Committee of Papers shall be determined by the majority of votes of those present and voting, and the voting shall be open, unless the President shall direct that the voting shall be by ballot. In case of an equality of votes, the President shall have a second or casting vote.

The decisions of the Committee shall be duly entered in the Minute-book of the Committee.

V. The *Philosophical Transactions* and the *Proceedings* shall be printed at the sole charge, and for the use and benefit, of the Society, and of the Fellows thereof; to the intent that each of the present Fellows, who actually contributes and pays towards the support of the Society, or who has compounded for such contribution, according to the rules and orders established in relation thereto, or who has for other particular reasons been exonerated and discharged from such contribution by order of the Council, may receive *gratis* (but under proper limitations and restrictions) one copy of such of the *Philosophical Transactions* and of the *Proceedings* as shall be printed as aforesaid; and that all persons who shall hereafter be admitted Fellows shall, under the same conditions, receive, and be entitled to, the like benefit and advantage.

VI. The Assistant Secretary shall deliver *gratis* one of the said copies of the *Transactions* to every Fellow of the Society (except as hereinafter excepted) who shall demand the same, either in person, or by letter.

Provided always, that no Fellow whatsoever of the Society shall be entitled to demand or receive any such copy of the *Transactions*, whose election and payment of Admission fees and regular Contributions shall not have preceded the date of the time appointed for the delivery of the said *Transactions;* neither shall the Executor of any deceased Fellow receive a copy of the *Transactions* published after the death of such Fellow.

Provided also, that no Fellow of the Society shall receive, or be entitled to receive, *gratis*, any copy or copies of the *Transactions*, so

printed as aforesaid, after five years shall have elapsed from the time of the Assistant Secretary's having begun to deliver out such copies respectively; but his neglecting to demand them for so long a time shall be deemed a forfeiture and dereliction of his right thereto: unless the Council for the time being, upon being made acquainted with the reason of such delay, and having regard to the circumstances of the application, and the amount of stock in hand, shall *order* such copies as they may think fit to be so delivered.

VII. The Assistant Secretary shall further cause to be distributed *gratis* to all the Fellows of the Society, by post or otherwise, copies of the *Proceedings* as soon as may be convenient after their appearance.

VIII. If the number of copies of *Transactions* and *Proceedings* so to be printed shall be greater than what will be requisite to supply each of the Fellows with one copy, such supernumerary copies shall be disposed of at such times, and in such manner, as the Council shall direct.

CHAPTER XIV.

Of the Books and Papers of the Society.

I. THERE shall be had and kept a Book, called the *Charter-book*, wherein shall be fairly written the copy of the Charters, all the Royal Grants on the behalf of the Society, and the Obligation to be subscribed by the Fellows of the Society in their own hand-writing.

II. There shall be kept a Book, called the *Statute-book*, wherein shall be fairly written, or printed, all the Laws, Statutes, and Constitutions made, or to be made, concerning the government and regulating of the Society or Council; and also a Register of the Fellows of the Society, with the times of their Election and Admission.

III. There shall be kept *Journal-books** of the Society, and also of the Council, wherein shall be entered all the minutes, orders, and business of the Society and Council at their respective meetings; to which Journal-books any Fellow may have access at such times as the Library is open.

IV. A Book shall be kept, in which the title of each communication received, the date of its reception at the apartments of the

* "The words 'Journal-books' do not include the Minute-books of the Government Grant Committee or those of the Government Grant Boards."—*Minute of Council, May* 24, 1894.

Society, and the name of the Fellow or Foreign Member who communicates it, shall be duly entered in the order of its reception.

V. The original copy of every Paper received at the Society shall be considered the property of the Society, if there be no previous engagement with its author to the contrary; but any author may withdraw a paper which has been received but not read; or may, by leave of the Council, have a copy of his paper; and it shall be in the power of the Council, if they think fit, to return to any author such drawings or other illustrations accompanying any paper communicated by him or on his behalf, which he may ask in writing to be returned to him.

VI. All the Papers not withdrawn by leave of the Council, and read at the Society, shall be delivered to the Committee of Papers; and all Papers which have not been printed in the *Transactions* or *Proceedings* shall be preserved in the archives of the Society for future inspection; and shall never be lent out of the Society's House without Order of the Council.

VII. The Library shall be open to the Fellows every week-day (exclusive of Good Friday and Easter-eve, of Easter week, of a week at Whitsuntide, and of a week at Christmas), from 11 A.M. to 6 P.M., except on Saturdays, when it shall be open from Eleven in the morning to One in the afternoon; but during the months of August and September it shall be closed on week-days, other than Saturdays, at 4 p.m.

VIII. Any Fellow may have the loan of any of the printed Books of the Society, excepting such as the Council shall order not to be taken out of the Library; but he shall not be allowed to have in his possession more than ten volumes at a time. The loan of Manuscripts is exclusively vested in the President and Council.

IX. A List of all Books and Manuscripts borrowed from the Library of the Royal Society, and of the Fellows of the Society to whom they are lent, shall be kept in the Library.

X. All Books whatsoever belonging to the Society shall be returned at a time to be specified by the Council, in each year; and the Library shall be closed for one month after such time, or for such shorter periods as the Council may direct.

XI. The value of such Books in the possession of any Fellow as are not returned to the Library pursuant to the preceding Statute, shall be required to be paid by the person who has so detained them.

CHAPTER XV.

Of the Common Seal and Deeds.

I. The Common Seal of the Society shall be kept in a box, the key of which shall be kept in a sealed packet. When the Common Seal has to be used, this packet shall be opened by the President in Council; and at the Council meeting at which it is so opened, the Common Seal having been replaced in the box, and the box locked, the key shall again be enclosed in a packet, which shall be sealed by the President with his private seal. The box and sealed packet shall be kept at the Society's chambers in an iron safe.

II. Every Deed or writing, to which the Common Seal is to be affixed, shall be passed and sealed in Council.

CHAPTER XVI.

Of the Restraint of Dividends to Fellows.

The Society shall not, and by its laws may not, make any Dividend, Gift, Division, or Bonus in Money unto or between any of its Members.

CHAPTER XVII.

Of the Making and Repealing of Laws.

I. For the making of any Law or Statute of the Royal Society, the draught thereof shall be read in Council, and put to the vote, on two several days of their meeting. The first day the question to be resolved by vote shall be to this effect, viz., "Whether the draught of the said Statute, then agreed upon, shall be read at another meeting?" The second day the question shall be to this effect, viz., "Whether the draught of the said Statute, then agreed upon, shall pass for a Law, or not?"

II. For the repealing of any Law or Statute, or any part thereof, the Repeal shall be proposed and voted in Council on two several days of their meeting. The first day the question to be resolved by Ballot shall be to this effect, viz., "Whether the Repeal of such a Statute, or such part thereof, shall be proposed at another meeting?" The second day the question shall be to this effect, viz., "Whether such a Statute, or such part thereof, shall be repealed, or not?" And in case the said Repeal be agreed unto, the same

shall be recorded in the Journal-book of the Council; and the Statute, or part of the Statute, repealed, shall be cancelled in the Statute-book.

January 1, 1897.

STANDING ORDERS OF COUNCIL RELATING TO MEETINGS, SECTIONAL COMMITTEES, AND PUBLICATIONS.

(*As amended Feb. 16th*, 1899.)

NOTE.

By Statute XIII, 1, the consideration of the acceptance, reading, and publication of all papers communicated to the Society is referred to the Council sitting as Committee of Papers; and in the following Standing Orders the word "Council," when used in connection with the acceptance, reading, or publication of papers, is to be understood to mean the Council sitting as Committee of Papers.

I.

Relating to the Conduct of Ordinary Meetings.

1. At each Ordinary Meeting, any formal business of the Society which may be necessary, such as the reading of certificates, balloting for candidates under Cap. I, Sec. IV, announcements, returning thanks for presents, &c., shall, unless the President direct otherwise, be the first business of the meeting.

2. At each Ordinary Meeting, not being "a Meeting for Discussion," as hereinafter provided, or for the Bakerian or the Croonian Lecture, the President shall determine what papers are to be read, and the order in which they shall be taken. He may also, whenever he sees fit, direct the author of a paper or one of the Secretaries to read an abstract of the paper or the paper itself, if it be sufficiently brief, or may invite the author to make an oral statement of the nature of its contents, and may also invite remarks upon the paper. When an oral statement is desired, the author shall, so far as possible, be previously informed of the fact. A paper shall be considered to have been "read" if one of the Secretaries has read its title only.

3. At any Ordinary Meeting, not being a "Meeting for Discussion," any Fellow of the Society may, with the approval of the President, and at such period of the Meeting as the President may determine, make a communication not of the nature of a "paper," or exhibit objects having relation to the advancement of Natural Knowledge.

4. The President shall further have power at any Ordinary Meeting, and at any period of that Meeting which he may think proper, to make such announcements or statements, as he may think desirable, relating to the advancement of Natural Knowledge.

5. In each year certain Ordinary Meetings, not more than four in number (exclusive of the Meetings set aside for the Bakerian and Croonian Lectures respectively), shall be devoted each to the hearing and consideration of some one important communication, or to the discussion of some important topic; these Meetings shall be termed "Meetings for Discussion."

6. The Council shall from time to time give due notice of the dates at which Meetings for Discussion will be held.

7. The Council, of its own motion, or upon the cecommendation of a Sectional Committee, may select some communication made to the Society in the ordinary way, as the subject for such a Meeting for Discussion, or it may select for that purpose some question, the discussion of which would, in their judgment, be likely to advance Natural Knowledge. In the latter case, the Council shall appoint some person to open the discussion by means of a communication made by him for that purpose.

8. When a Meeting for Discussion has been arranged, the Council, or the Officers, shall direct printed copies of the communication which has been approved of for the said Meeting (or of an adequate abstract of it), to be sent not later than one week before the date of the Meeting, to each Fellow, or to certain Fellows of the Society, and to such other persons as the President may direct. And the Council shall take such other steps as may seem to it desirable to render the discussion useful towards the advancement of Natural Knowledge.

9. At each Meeting for Discussion, the conduct of the discussion shall be under the direction of the President, who shall arrange for the Fellows present and desiring to speak, and who shall have the power to invite, if he think fit, persons present, not Fellows of the Society, to take part in the discussion. Any Fellow shall be at liberty to send to the Secretaries, previous to the Meeting, written remarks on the communication which is the subject of the meeting, and the President shall, if he see fit, direct one or other of the Secretaries to read these remarks at the meeting.

II.

Relating to Sectional Committees.

10. The Council shall appoint, from among the Fellows of the Society, Committees representing the several branches of Natural Knowledge, and called "Sectional Committees." The Members of each Committee shall be chosen with a view to secure, so far as is possible, a representation of the several sub-divisions of each branch of Natural Knowledge, and to obtain the assistance of Fellows who, from their connection with other societies, and otherwise, are specially qualified to advise the Council in respect to particular parts of Natural Knowledge.

11. It shall be the business of each Sectional Committee to advise the Council (whether sitting as the Committee of Papers or otherwise) or the Officers upon matters referred to it by the Council or by the Officers, and otherwise to make to the Council such suggestions as it may think desirable touching the branch or branches of Natural Knowledge which it represents, it being understood that no Sectional Committee shall offer advice to the Council as to the selection of candidates for admission into the Society as Fellows or Foreign Members, or as to the awards of Medals, unless the Council shall have asked for such advice.

12. The Council shall each year appoint a Member of each Committee to serve as Chairman of that Committee, and to be the channel of communication between the Committee and the Council or Officers.

13. The Sectional Committees shall be six in number, viz.:—

(1) A "Mathematics" Committee for Mathematics, Mathematical Physics, Crystallography, and Mathematical Astronomy.

(2) A "Physics and Chemistry" Committee for Experimental Physics, Observational Astronomy, Meteorology, Chemistry, and Metallurgy.

(3) A "Geology" Committee for Geology, Palæontology, Mineralogy, and Geography.

(4) A "Botany" Committee for Botany.

(5) A "Zoology" Committee for Zoology and Comparative Anatomy.

(6) A "Physiology" Committee for (Animal) Physiology and Medical Subjects.

14. The "Mathematics" Committee shall consist of six Members, of whom two shall retire each year; three Members shall form a quorum.

The "Physics and Chemistry" Committee shall consist of twelve Members, of whom four shall retire each year; five Members shall form a quorum.

The "Geology" Committee shall consist of nine Members, of whom three shall retire each year; four Members shall form a quorum.

The "Botany" Committee shall consist of six Members, of whom two shall retire each year; three members shall form a quorum.

The "Zoology" Committee shall consist of nine Members, of whom three shall retire each year; four members shall form a quorum.

The "Physiology" Committee shall consist of twelve Members, of whom four shall retire each year; five members shall form a quorum.

15. Any Member of Council who desires to attend the meetings of any Sectional Committee, of which he is not at the time being a Member, shall have power to do so as *amicus curiæ* under the following conditions. Upon his expressing in writing to the Assistant Secretary his wish so to attend, the summons for each meeting of the Committee shall be sent to him as to an ordinary Member of the Committee during his tenure of office as Member of Council, or during such shorter time as he may name; but the Chairman of the Committee shall not be expected to correspond with him as with an ordinary Member of Committee. He may with the consent of the Chairman speak during the deliberations of the Committee, but shall give no vote.

16. It shall be in the power of the Council to add to the number of any Committee, if at any time it may seem to be desirable to do so.

(The following Standing Orders, 17—28, *are the same for each Sectional Committee.)*

17. The retirement of Members shall be determined by seniority.

18. The retiring Members of the Committee shall each year vacate office on the 31st of December, and shall not be eligible for election for the ensuing year.

19. Should, by reason of death or otherwise, a vacancy occur at any intermediate time, the Council shall appoint a person to fill the vacancy, and the retirement of the person so appointed shall be according to the rules which would have applied to the Member whose place he fills, provided that, if at the date of retirement the said person has not served more than one year, he shall be eligible for immediate re-appointment.

20. The appointment of the Fellows to serve as new Members of Committee shall be made by the Council in December, and the

Members so appointed shall enter office upon the 1st of January ensuing.

21. The Committee shall, when necessary, meet in the apartments of the Society at some convenient hour on the second Thursday in each month from October to July, both included, or at such other times and places as the Chairman may determine.

22. The summonses for a meeting shall be issued by the Assistant Secretary at the direction of the Chairman.

23. The decisions arrived at by a meeting of a Committee at which the Members present do not form a quorum shall be valid, if subsequently agreed to in writing by not less than two-thirds of the whole Committee.

24. Voting shall be open, unless any Member of the Committee shall demand the ballot. The Chairman shall have a second or casting vote.

25. The Minutes of the Committee shall be duly recorded in a book kept for that purpose, and preserved in the apartments of the Society, or in the custody of the Chairman, together with such correspondence and documents relating to the business of the Committee as the Committee may think it desirable to preserve.

26. The Committee shall make to the Council, through its Chairman, who shall be provided by the Society with such clerkly assistance as he may need, reports to the Council, answers to inquiries of the Council, and such suggestions as the Committee may think desirable. The minutes of the Committee shall be laid before the Council whenever the Council shall so demand.

27. When a Committee is of opinion that a paper referred to it might profitably serve as the basis of a discussion at a meeting of the Society, it shall forthwith report to that effect to the Council. If the matter seem urgent, the President and Officers shall have power, without waiting for a Meeting of the Council, to take immediate steps towards carrying out the recommendations of the Committee.

28. Should, at any time, a Committee be of opinion that it would be desirable to encourage a discussion at a meeting of the Society upon some subject, concerning which no paper suitable to serve as a basis for discussion is under its consideration, and have ascertained that some person is willing to prepare a suitable paper for that purpose, the Committee, having approved of the said paper, shall recommend it to the Council, to be treated as the basis of a discussion to be held at some convenient meeting.

III.

Relating to the Acceptance, Reading, and Publication of Papers.

29. Upon a communicated paper reaching the apartments of the

Society, the Assistant Secretary shall mark on it the date of the reception, shall record the reception in the book kept for that and other purposes relating to papers received, and shall report the reception to the one or the other of the two Secretaries, according to the nature of the communication.

30. The Secretary to whom the paper is thus reported shall, if he sees fit, of himself, or after consultation with the other Officers or with the Chairman of the appropriate Sectional Committee, direct the paper to be marked as "accepted for consideration," otherwise he shall refer the question of acceptance for consideration to the appropriate Chairman of Sectional Committee, who shall at a meeting of his Committee, or by correspondence with its Members, obtain the view of the Committee thereupon, and report the same to the Secretary, who shall act on the advice so given.

31. In the case of a paper not being accepted for consideration, the Fellow communicating the paper shall be informed thereof, but the paper itself shall remain the property of the Society, provided always that such Fellow may, with the consent of the Council, withdraw the said paper, upon the understanding expressed in writing that the paper is to be regarded as not having been communicated to the Society at all.

As to the 'Proceedings.'

32. In the case of a paper being accepted for consideration, the author shall be required to furnish, if he has not already done so, a short account of the main points of the paper, hereinafter called an "abstract," of such length and nature as shall be approved of by the Secretaries; provided that if the paper do not exceed in length about twelve pages of the 'Proceedings' (such a paper being hereinafter called a "short" paper), an abstract of it shall not be required.

33. In the case of a paper accepted for consideration, and of which when required an abstract has been furnished, the Secretaries shall proceed to make arrangements for the reading of the paper, and shall, if they think fit, of themselves, or after consultation with the Chairman of the appropriate Sectional Committee, mark the abstract or short paper as suitable for publication in the 'Proceedings'; otherwise they shall refer the question of publication of the abstract, or in the case of a short paper, of the paper itself, to the Chairman of the appropriate Sectional Committee, who shall, either at a meeting of the Committee, or by correspondence with its Members, obtain the view of the Committee thereupon, and report the same to the Secretaries, who shall act upon the advice so given.

34. In all cases where the Secretaries have, as regards the acceptance or reading of any paper, or the publication of any abstract or

paper, acted under Standing Order 30, or 33, of themselves, or after consultation with a Chairman of Committee only, the Committee itself not having been formally consulted in the matter, such action shall be reported to the Committee.

35. When a paper has been accepted for consideration, and appointed to be read, the author shall be informed of the meeting at which it is appointed to be read, and shall be supplied with a copy of Standing Order 2. In cases where the President or Secretaries, after consultation (if they see fit) with the appropriate Sectional Committee or its Chairman, are of opinion that at the meeting the author of the paper should be invited to make an oral statement, or that the abstract (or short paper) prepared for publication in the 'Proceedings' should be read, the author shall be informed of the fact, and be invited to be present.

36. Abstracts of papers, or short papers in full, which have been marked as suitable for publication in the 'Proceedings,' shall be set up in type without delay, and proofs submitted to authors for correction.

37. The 'Proceedings' of the Royal Society shall be published in numbers which shall be issued at as short intervals as may be found suitable, and shall contain:—

i. In reference to each meeting, a record of the formal business conducted at the meeting, the titles of the papers read at the meeting, and such an account of other communications made at the meeting or of other proceedings, not of the nature of business or of discussions on the papers read, as the President and Officers may judge it desirable to insert.

ii. Such abstracts of papers or such short papers ordered for publication in the 'Proceedings,' as may be ready to be published.

iii. Such papers, not of the nature of short papers, or such other matter as the Council may, in special cases, order to be published in the 'Proceedings.'

38. The Secretaries shall take what means they may think proper to secure that the account given in the 'Proceedings' of any communication made at a meeting besides the papers read, or of anything which occurred and seemed worthy of being recorded, shall be accurate; and if, from anything which takes place at a meeting, they should have reason to think that the Sectional Committee might wish, in respect to any paper, to reconsider the recommendation that it should be published, they shall have power to postpone the publication of that abstract or paper, and refer the abstract or paper once more to the Sectional Committee.

39. The account given in the 'Proceedings' of a "Meeting for Discussion" shall contain the communication made for the purpose of

opening the discussion (Standing Order 7), as well as such contributions to the discussion received in writing previous to meeting (Standing Order 9) as the respective authors may desire to see so published, provided always that all such communications are subject to the General Standing Orders relating to the publication of papers in the 'Proceedings.' There shall be no report of the discussion itself.

As to the 'Philosophical Transactions.'

40. Every paper communicated to the Society, and accepted for consideration, shall be referred by the Secretaries to the appropriate Sectional Committee through the Chairman of that Committee, provided always that, for the better expedition of the business of the Society, the Secretaries, as provided above (Standing Orders 33 and 36), shall have power, in the case of short papers, to proceed with the reading and publication of a paper previous to its having been considered by a Committee. If the said Chairman is of opinion that the subject of the paper does not lie within the scope of his Committee, he shall report the same to the Secretaries, who shall refer the paper to some other Sectional Committee. Should the Secretaries be of opinion that a paper pertains by its subject to more than one Sectional Committee, they shall take steps in order that the judgment of the several Committees concerned may be obtained. In the case of any difficulty as to the reference of a paper to its appropriate Sectional Committee or Committees, the Secretaries shall bring the matter before the Council.

41. The Chairman through whom the paper is referred shall bring the paper under the consideration of his Committee at the next regular meeting of the Committee, or at some earlier meeting which he may think it desirable to call, having in the meanwhile, if he and one or other of the Secretaries judge it desirable, submitted the paper to one or more Members of the Committee, or Fellows of the Society not Members of the Committee, whose opinion or opinions he shall report to the Committee.

The Sectional Committee, for its guidance in judging a paper so brought before it, shall obtain from at least two persons—who are knowing and well skilled in the particular branch of Natural Knowledge to which the said paper relates, and who may or may not be Members of the Committee, but, unless there be special reasons to the contrary, must be Fellows of the Society—acting as referees, opinions in writing upon the following points, viz.:—

i. Whether the paper should or should not be published in the 'Philosophical Transactions';

ii. Whether, in the former case, it should be published in full or in part only, the part so to be published being indicated;

iii. Whether any modifications are necessary or desirable, and, if so, of what nature;

iv. Which illustrations (if any) accompanying the paper should be reproduced.

Having obtained and considered such written opinions, and having, if it see fit, consulted another Sectional Committee or others of the Sectional Committees, and having at a meeting (in accordance with Standing Orders 23, 24) decided upon the above points, it shall embody its decisions, together with any other recommendations which it may think fit to make in reference to the paper, in a Report to the Council, signed by the Chairman, to which Report shall be appended, for inspection by the Council, the written opinions of the Referees.

42. The Sectional Committee, in thus deciding upon a paper, shall be guided by the principle that such a paper only should be recommended for the 'Philosophical Transactions' as appears to mark a distinct step in the advancement of Natural Knowledge.

43. If the Council approves of the Report of the Sectional Committee, the Secretaries shall immediately take action with regard to the publication of the paper, in accordance with the Report. If the Council does not approve of the report of the Sectional Committee, it shall request the Sectional Committee to reconsider its recommendations, and shall not come to a decision until it has received the further report of the Sectional Committee. But, for the better expedition of the business of the Society, the Secretaries, in such cases as they judge fit, shall have power to take steps with regard to the publication of a paper in the 'Philosophical Transactions,' in accordance with the decision of a Sectional Committee, previous to that decision having been brought before the Council; and they shall also have power, in cases in which they and the Chairman of the appropriate Sectional Committee agree in thinking it desirable, to take such steps as they may think fit with regard to the publication of a paper in the 'Philosophical Transactions,' previous to a formal decision of the said Committee upon the paper having been taken.

44. In the case of the Chairman of a Sectional Committee being the author of a paper referred to that Committee, the Secretaries shall have power, in consultation with some member or members of the Committee, other than the Chairman, to take the same action as under the foregoing standing orders they are empowered to take in consultation with the Chairman.

45. Each paper ordered for publication in the 'Philosophical Transactions' by the Council shall be published separately in paper covers, the date at which it is issued being marked on the cover, and shall be sold separately.

46. The several papers shall also be issued bound in two series—

A, containing those papers which are of a mathematical or physical character, and B, containing those of a biological character—at intervals, so far as possible regular, and of not too great a length no paper being kept back more than six months from the date of its publication as a separate paper.

47. In the case of communications received in the Christmas, the Easter, or the Midsummer recess, the Secretaries shall have power, with the approval of the Chairman or Chairmen of the appropriate Sectional Committee or Committees, to issue a number or numbers of the 'Proceedings' containing such communications, without waiting for their being read at a meeting of the Society.

48. When the Council or the Society has appointed a person, or two or more persons acting as Committee, to carry out a particular inquiry, and the person or Committee has presented a report giving an account of such inquiry, the Council, having consulted the appropriate Sectional Committee or Committees in the usual way as in the case of a paper presented, shall direct the report, if deemed worthy of publication, to be published either in the 'Proceedings,' as a separate number if this should seem convenient, or in the 'Transactions,' according as the one or the other may seem the more suitable for the purpose.

49. A Year-book of the Society shall be published annually, so soon after the Anniversary Meeting as shall be convenient.

IV.

Relating to the Committee of Papers.

50. The Minutes of the Council sitting as Committee of Papers shall be kept separately from the ordinary Minutes of Council.

51. At each meeting of the Committee, the Secretary shall lay before the Committee a statement of the papers under consideration, showing briefly in the case of each paper the action which has been taken in regard to it, and the recommendations which may have been made concerning it by a Sectional Committee, together with, in the case of a paper recommended for publication in the 'Philosophical Transactions,' an approximate estimate of the cost of publication. Such a statement, or so much of it as is possible, shall be printed and distributed to the Members of the Committee previous to the meeting.

52. At each Meeting of the Committee the written decisions of the Sectional Committees, and the reports of referees, which may have been made in respect to papers mentioned in the Statement, shall be laid upon the table.

53. The Committee may, if it see fit, adopt *en bloc* all the recommendations contained in a Statement, provided always that if any Member of the Committee, either personally or, if absent, by writing,

object to any particular recommendation or recommendations, such recommendation or recommendations shall be considered separately, the remainder being treated *en bloc*.

54. The decisions of the Committee on all questions before it shall be by the majority of those present and voting, the voting being open unless any member demand a ballot, in which case the voting shall be by ballot.

EXPLANATORY NOTES ON THE PROCEDURE RELATING TO THE READING AND PUBLICATION OF PAPERS.

1. No paper is received by the Society unless it be communicated by a Fellow. A Fellow, in communicating a paper, is required by Statute to ascertain that the paper is a fit and proper one to be communicated; he should satisfy himself not only that the paper is by its nature so fit, but also that it has not previously been published elsewhere.

A Fellow, in communicating a paper, should state whether he (or the author) desires that it should be published in the 'Proceedings' or in the 'Transactions.' In the former case, the Fellow communicating should see that the paper does not exceed in length about twelve pages of 'Proceedings,' and is not accompanied by elaborate illustrations; in the latter case, a short abstract of the main points of the communication must accompany the full paper. Since the MS. of a communication received and read, but not published by the Society, is retained in the possession of the Society,* an author is recommended not to send in the sole copy of his MS.; and it is advisable that the copy sent to the Society should be type-written, and, if possible, on a foolscap page.

It will be also convenient if, at the time of sending in the paper, the Assistant Secretary is informed what days of meeting will best suit the author for the reading, supposing it be decided that the paper should be read, and whether he wishes to be present, and whether he is prepared to illustrate the reading of the paper by experiments, projection slides, diagrams, &c. The Society cannot, however, undertake always to fix the reading of the paper on the day or even one of the days proposed by the author.

2. When a communication has been "received," the first decision taken with regard to it is whether it should be "accepted for consideration." (Standing Order 30.)

If it be not accepted for consideration, the Fellow communicating

* While retaining a MS. not ordered for publication, the Council are generally willing to return to the author drawings, &c., illustrating the paper.

the paper is informed of this, and he may, under certain conditions, withdraw the paper. (Standing Order 31.)

3. If it be accepted, the next decision relates to the reading of the paper.

According to the nature of the paper, and according to circumstances, the reading may consist of the title only being read by one of the Secretaries, or the paper may be read in whole or in part by one of the Secretaries, or the author may be invited to give an oral exposition of the contents of his paper, with such experimental or other illustrations as he may desire.

A decision having been come to as to the date of the reading, this will be communicated to the author, who, according to the decision taken, will be invited to be present, and may be requested to give an oral exposition.

4. When a paper has been judged suitable for publication in the 'Proceedings,' it is without delay set up in type, so that, if possible, printed copies may be in the hands of Fellows at the meeting at which the paper is read. A proof of the paper is sent to the author with the request that he will revise the proof as carefully as possible, and return it to the Assistant Secretary as soon as possible.

It may be found desirable to set up in type and even distribute at a meeting a paper which has been marked for reading, but about the publication of which no decision has as yet been come to. Hence, receipt of the proof must not be considered by the author as an indication that the paper will certainly be published.

5. If the author, in revising the proof thus sent to him, be led to make other than verbal or unimportant corrections, or to make additions, he must, in view of the publication of the paper, carefully date all such important corrections or additions. Any such corrections or additions introduced into any subsequent revise of the paper must be similarly dated.

A paper, when published, bears on it the date of reception of the MS.; this may be used in claims of priority, and the rule just given about dating corrections and additions is intended to prevent the author claiming the date of the reception of the MS. for important statements introduced into the paper after that date.

6. An author can, if time permits, receive, on application to the Assistant Secretary, any reasonable number of copies of the proof of his paper, corrected so far as is possible, in order that if he so wishes he may send, before the meeting at which the paper is read, copies of the proof to persons likely to take part in any discussion which may follow the reading of the paper. The Society leaves to the individual author the responsibility of thus making known the results of his labours before the account of those results is formally read; so far

as the Society itself is concerned, a paper communicated to it is regarded as private until it has been read.

7. When a paper has been ordered for publication in the 'Proceedings' and read, it is desirable to avoid everything which would delay its publication. Hence an author should correct the first proof of his paper so carefully that he does not need to see a second proof or revise. It will frequently, however, be found desirable for the author to see such a revise after the paper has been read. It is most important that the corrections then made should be final, and should be made without delay. A demand for still another revise, or any delay in returning that revise, is nearly sure to prevent the paper appearing in the particular number of the 'Proceedings' which gives an account of the meeting at which the paper was read.

8. Editors of periodicals are often anxious to obtain copies of the papers read before the Society, in order that they may publish them, in whole or in part, in their own periodicals, without waiting for the appearance of the papers in the 'Proceedings' of the Society. The Society offers no objection to this practice, provided that the copy sent to the periodical is identical with the paper as it will appear in the 'Proceedings.' For this reason the Society keeps the distribution of such copies in its own hands, and does not entrust it to the authors. Otherwise, the Society would have no guarantee against the following accidents, which, indeed, previous to the present arrangements having been made, did actually occur. If it were left to the author, he might send to a periodical an early proof of a paper which, before it was ordered for publication, needed large amendment, so that the paper, as it appeared in the said periodical, might differ widely from the paper as it appeared in the 'Proceedings.' Again, since a paper ordered for reading is, for the convenience of Fellows attending the meeting at which the paper is read, usually set up in type without delay, and may be, indeed often is, so set up before it has been decided to publish the paper, it might happen (and, indeed, has happened) that an author sent to a periodical a copy of a paper as if it were about to appear in the 'Proceedings,' and yet that paper never so appeared. To avoid such undesirable occurrences, the following practice has been adopted. With the proofs of his paper the author receives a form to fill up, stating to what periodicals he wishes separate copies of his paper, *so soon as it is finally passed for press*, to be sent, and the Society distributes the copies according to the list returned. The form sent to the author contains the titles of several periodicals to which separate copies will be sent on his returning the form with his signature attached. The author can modify the list as he wishes, striking out from or adding to it.

9. When a paper is printed off for the 'Proceedings' the author

is entitled to receive gratis 100 separate copies; he can have 150 additional separate copies at cost price.

10. One object of the regulations just described is to enable the Secretaries to publish as quickly as possible the papers (including abstracts) ordered for publication in the 'Proceedings,' and, save in special cases, the deliberations necessary for ordering these to be published do not take a long time.

Any decision as to publishing a paper in the 'Philosophical Transactions' necessarily takes a longer time, since the responsibility of this rests with the Sectional Committee or Committees and the Council, no such freedom of action being given to the Secretaries and Chairmen of Committees as is given in the case of papers published in the 'Proceedings.' The author, however, may greatly help to shorten the interval between the reception of a paper and its publication in the 'Philosophical Transactions' by attending to the following matters :—

(1) The MS. should be, if possible, type-written, or at least written in a legible hand, and *properly prepared as copy for press*, so that the subsequent corrections in spelling, grammar, construction of sentences, references, &c., may be as few as possible.

(2) When the paper is accompanied by illustrations, these should be sent in *ready for reproduction*. Figures, for instance, for which a "process" can be used, should be supplied in a condition in which the process may be directly applied; figures intended to be lithographed should be properly arranged as Plates of the proper size, and so on.

(3) When the author is requested to make changes or additions to his paper before it is published, these should be made without delay; the tardy appearance of papers in the 'Philosophical Transactions' has often been due to delay of this kind on the part of the author.

PROCEDURE IN THE NOMINATION OF THE COUNCIL.*

1. The subject of the new Council shall be taken into consideration at a Meeting of Council to be held on the last Thursday of October; and with the summons for that Meeting there shall be transmitted a list of the Members of the existing Council, with the number of their attendances at Meetings up to that date; also a List of the Fellows of the Society, with an indication of those who have at any time served on the Council, and the dates of their service.

2. At this Meeting the names of those Members of the existing Council who retire at the ensuing Anniversary shall be determined.

* From Minutes of Council, June 20, 1872.

Thereafter each Member present shall hand to one of the Secretaries a List of not exceeding ten Fellows whom he proposes for the new Council, of whom five shall not have already served on the Council. Members not able to be present may send in similar lists previous to the Meeting. The several lists of names so proposed shall then be read out by the Secretary.

3. Before the next following Meeting, the President and Officers shall prepare a list of twenty-one names for consideration by the Council, which list shall include ten names selected from those proposed at the previous Meeting, or other names, if required to make up that number. The list so prepared, together with a statement of the names proposed, and the number of votes given for each, shall be sent out confidentially with the summons for the ensuing Meeting, at which Meeting the names to be finally recommended shall be balloted for. In taking the ballot, a copy of the list, prepared by the Officers, shall, with such alterations as he may see fit to make therein, be delivered by each Member of the Council present and voting, and the names found to have the majority of votes shall form the list to be recommended to the Society.

4. The President and Council shall then nominate by ballot, out of the proposed Council, the persons whom they recommend to the Society for election to the offices of President, Treasurer, Principal Secretaries, and Foreign Secretary, for the ensuing year.

PROCEDURE OF THE COUNCIL IN THE NOMINATION OF FOREIGN MEMBERS.

(*Statutes, Cap. I, §§ XIX—XXI.*)

XIX. "A book shall be kept in which Members of the Council may enter the names of those men of science whom they suggest as Foreign Members; each entry shall be signed by the proposer, and be accompanied by a short statement of the principal grounds on which the suggestion is made, and shall be valid for three years only.

XX. "When vacancies are to be filled up, a list of the persons so entered shall be sent to each member of the Council, together with notice of the Meeting at which the list will be considered. At the Meeting thus appointed further entries may be made, and the claims of those men of science whose names have been duly entered in the book shall be considered, and a selection of names shall be

made, from among which the Council, at a subsequent Meeting to be then appointed, may make nominations to the Society.

XXI. "At the second Meeting the selection of the Candidates to be nominated shall be by ballot; when, if two-thirds of the Members of the Council present be in favour of the nomination of any Candidate, he shall be proposed at the next Ordinary Meeting of the Society, and shall be put to the vote at the following Ordinary Meeting."

PROCEDURE OF THE COUNCIL IN THE ADJUDICATION OF THE MEDALS.

1. At the first Meeting on the subject of the Medals, the Members of Council are invited to *suggest* a name, or names, which they may deem worthy of consideration in the adjudication of each of the several Medals. The list of suggested names then formed to be entered on the Minutes, with power to Members of Council to add to it afterwards, if they see fit.

2. At a subsequent Meeting (or Meetings), to be held before the Midsummer Recess (at which additions may be made to the List of suggestions), every Member of the Council present is at liberty to *propose* for each Medal the name of a person whom he recommends to be selected to receive it, specifying the particular work or works which form the ground of his recommendation; and these proposals, being seconded, shall be entered on the Minutes. At the same time the proposer is expected to deposit with one of the Secretaries a detailed statement of the claims of the person recommended by him, for consultation by Members of the Council, should they so desire.

3. The Council to be summoned on the last Thursday of October, for the purpose of discussing the merits, as regards the award of the Medals of the persons severally proposed. Additional proposals may be made at this Meeting, if assented to by two-thirds of the Members present.

4. The Council to meet for further consideration of the proposals on the first Thursday in November; the awards to be decided either on that day or at an early adjourned Meeting.

CONDITIONS OF AWARD OF THE ROYAL SOCIETY'S MEDALS.

The Copley Medal

is awarded to the living author of such philosophical research, either published or communicated to the Society, as may appear to the Council to be deserving of that honour. The subject or subjects of research, on account of which the medal is awarded, must be specified in making the award.

No limitation is imposed either as to the period of time within which that research was made, or to the particular country to which its author may belong.

The medal may not be awarded to any person who is a Member of the Council at the time when the award is made.

The medal may be given more than once to the same person if the Council deem it expedient.

The medal is, as far as circumstances admit, awarded annually.

The Rumford Medal,

consisting of a gold medal with a silver copy struck in the same die, is awarded once every second year "to the author of the most important discovery or useful improvement which shall be made and published by printing or in any way made known to the public in any part of Europe during the preceding two years on Heat or on Light, the preference always being given to such discoveries as, in the opinion of the President and Council of the Royal Society, tend most to promote the good of mankind.

"If during any term of years from the last award no new discovery or improvement shall have been made in any part of Europe relative to Light or Heat, in the opinion of the President and Council of sufficient importance to deserve the award, it may not be given, but the value of it may be reserved, and being laid out in the purchase of additional stock may augment the capital; and the interest of the same, by which the capital may from time to time be so augmented, may be given in money" at a subsequent award with the two medals.

The Royal Medals,

consisting each of a gold medal with a silver copy struck in the same die, are awarded annually by the Sovereign upon the recommendation of the Council, for the two most important contributions to the advancement of Natural Knowledge, published originally in Her Majesty's dominions within a period of not more than ten years, and of not less than one year of the date of the award.

In the award of the Royal Medals one is given in each year to each of the two great divisions of Natural Knowledge.

THE DAVY MEDAL

is awarded annually for the most important discovery in Chemistry made in Europe or Anglo-America.

THE DARWIN MEDAL,

which is accompanied by a grant of £100, is given biennially in reward of work of acknowledged distinction (especially in Biology) in the field in which Mr. Darwin himself laboured. The award may be made either to a British subject or a foreigner, and without distinction of sex.

THE BUCHANAN MEDAL,

which is accompanied by a grant of the balance of the Buchanan Medal Fund which may have accumulated since the last award, is awarded every five years in respect of distinguished services to Hygienic Science or Practice in the direction either of original research or of professional, administrative, or constructive work, without limit of nationality or sex.

THE SYLVESTER MEDAL,

which is accompanied by a grant of the balance of the income of the Sylvester Medal Fund, is awarded triennially for the encouragement of pure Mathematical Research, irrespective of nationality.

REGULATIONS FOR ADMINISTERING THE GUNNING FUND.

A statement of the foundation will be found in the Account of the Society's Trusts, in the 'Record.' The regulations for its administration, proposed by the Council, March 14, 1895, and adopted by the Founder, May 16, 1895, are here subjoined.

REGULATIONS.

1. That the Fund should not be applied in the form of a prize, medal, or reward, but should be devoted to the furtherance of knowledge in some special direction.

2. That, by preference, the interest accruing from the Fund during every three years be applied for the promotion of Physical Science and of Biology alternately.

3. That aid should, by preference, thus be given in Physical Science and Biology respectively, either to investigations or operations which require to be repeated from time to time, or to the development of some specified continued line of research.

In illustration of Regulation 3, the Council suggested as follows:—"Among subjects that would thus seem fitting for the application of the

Fund, the following might be given as instances:—The renewal from time to time of magnetic observations in the British Isles; the compilation and publication, at intervals, of detailed lists of well-authenticated spectra; systematic determination of biological data in special regions or under special conditions; assistance to naturalists or others carrying on explorations or special investigations in foreign countries; continued bacteriological observations, similar to those carried out under the direction of the Water Research Committee and others."

REGULATIONS FOR ADMINISTERING THE JOULE FUND.

(*Council Minutes, March* 14, 1893.)

1. That the proceeds be applied in the form of a Studentship or Grant, to be awarded every other year, to assist Research, especially among younger men, in those branches of Physical Science more immediately connected with Joule's work.

2. That this Grant be International in its character, and awarded alternately in Great Britain and abroad, or in such order as the President and Council shall from time to time decide.

3. That it be awarded in Great Britain by the President and Council of the Royal Society; and, for award in France, offered to the "Académie des Sciences," Paris; and in Germany, to the "K. Akademie der Wissenschaften," Berlin; or, in any other country, to the leading scientific institution, for award in that country.

4. That the award in Great Britain be made on the recommendation of a Committee, from time to time appointed by the President and Council of the Royal Society, but not of necessity confined to Fellows of the Society.

PUBLICATION FUND REGULATIONS.

(*Council Minutes, June* 15, 1899.)

The following scheme of regulations for the administration of the Publication Grant from H.M. Treasury, has been adopted by the Council:—

Regulations for the Administration of the Government Publication Grant.

I. The allotment of the Grant shall be made by the President and Council.

II. In allotting the Grant, the President and Council shall "assist not merely their own publications, but also the adequate publication of scientific matter through other channels and in other ways."

III. In making allotments for the purpose of assisting the adequate publication of scientific matter other than the Society's own publications—

1. The President and Council shall consider—
   (i.) Proposals made by Members of the Council.
   (ii.) Applications made by other Scientific Societies through the usual official channels.
2. Original memoirs shall be considered as having a first claim on the Grant, the aid being given towards the expense either of illustrations or of press-work; but the President and Council shall have power, if they see fit, to make an allotment in aid of other publications which tend to the advancement of natural knowledge, such as reports, abstracts, &c.
3. No decision of the President and Council at any one meeting of the Council, to allot a portion of the Grant, shall be valid unless it receives the support of three-fourths of the members present and voting; but the decision of a simple majority at any one meeting shall be made valid if confirmed by a majority at a subsequent meeting.

IV. The balance of the Grant remaining over at the close of the financial year, after deducting the amounts allotted under Section III, shall be placed to the credit of the General Fund of the Society, to assist in the production of the Society's own publications, unless the President and Council shall otherwise order.

REGULATIONS FOR ADMINISTERING THE SCIENTIFIC RELIEF FUND.*

The history of the Scientific Relief Fund will be found in the account of the Society's Trusts contained in the "Record." The following are the Regulations at present in force:—

Regulations.

1. There shall be a fund called The Scientific Relief Fund, and the object of it shall be to aid such scientific men, or their families, as may from time to time require assistance.

* Mainly codified from the Original Regulations adopted by the Council Nov. 3, 1859 (see also Minutes of May 26, 1859), and subsequent modifications passed by the Council on Dec. 22, 1859, Jan. 18, 1866, April 30, 1891, Jan. 19, 1893, April 30, 1896, Nov. 5, 1896.

2. All contributions to the fund shall be invested in the name of the Royal Society in such funds as are authorised for investment by Trustees; and in such manner as to form a separate account from that of the Society's other funded property.
3. The fund shall be administered by a Committee, called The Scientific Relief Committee, which shall consist of ten Fellows of the Royal Society, and it shall be the duty of such Committee to select the recipients on whose behalf the income derived from the fund may be properly applied—always reporting thereon to the Council for confirmation.
4. The capital of the Fund shall remain entire, and the interest only shall be at the disposal of the Committee.
5. If the whole of the interest shall not be expended in one year, the surplus shall be carried to the next year's account; and, if at any time any surplus in excess of the ordinary income of the year last past shall thus accrue, the Council shall cause the whole, or part of it, to be added to the capital sum already invested; or, should they think fit, may cause any accumulated interest to be invested as unexpended income, the securities purchased being liable from time to time to be realised, and the proceeds expended as income.
6. No application for relief shall be entertained except on the recommendation of the President of one of the following Scientific Societies:—The Chemical, Entomological, Geological, Linnean, London Mathematical, Physical, Royal, Royal Astronomical, Royal Geographical, Royal Meteorological, Royal Irish Academy, Royal Society of Edinburgh, Society of Antiquaries, or Zoological Society; it being understood that the several Presidents will consult their respective Councils as to the persons whom they intend to recommend for relief.
7. The members of the Committee shall be appointed by the Council, and shall consist of ten members, each of whom shall serve for five years, so that two retire annually, and be not eligible for re-appointment on the occasion of their retiring. Should a vacancy occur by reason of death or otherwise, at any intermediate time, the Council shall appoint a person to fill the vacancy, and the person so appointed shall retire at the time the member whose place he fills would have retired had he continued until then to be a member, but if he have not served more than two years shall be eligible for re-appointment.
8. The Council shall annually appoint a member of the Committee to act as Chairman for the ensuing year. The Chairman shall have power to nominate one of the Committee to act as his deputy.
9. The Chairman, or his deputy, shall have power to summon a

meeting of the Committee at his discretion, and shall fix the time of such meeting.

10. Three of the Committee shall form a quorum.
11. The Treasurer of the Society shall have power, on the requisition of the Chairman of the Committee, or of his deputy, made in pursuance of a resolution of the Committee, but subject, nevertheless, to the provisions of Regulation 12, to make payments out of the Scientific Relief Fund not exceeding £100 in any one case, reporting such action to the Council at its next meeting.
12. The Chairman, or his deputy, shall, notwithstanding Regulation 6, have power to act in urgent cases during vacations of the Society, after consultation with one of the Secretaries of the Society, without calling the Committee together. In such cases the Chairman shall, after the vacation, summon a meeting of the Committee and report his action.

In the first Report of the Committee, dated November 30, 1864, it is stated that "It formed no part of the scheme to attempt the grant of annuities; it was rather intended to afford *prompt* relief of the immediate wants of those upon whom sudden affliction had fallen; although at the same time, it in no way debarred a continuation of such relief being given should the funds admit thereof." This intention of the founders, although it has not been embodied in a Regulation, has been continued, as a policy, to the present time.

Applicants are desired to fill in a form which can be obtained from the Assistant Secretary of the Royal Society, in which (confidential) information is requested upon the following points:—

1. Name, Age, and Social Condition.
2. Nature of Claims, stating scientific work done by the subject of the proposed grant, or by the member of his family on whose scientific claim he relies, appending a list of his principal contributions to science.
3. The nature of the emergency, and how it has arisen.
4. Whether the applicant is receiving, or has received, during the past six months, pecuniary aid from any other source.
5. Whether the applicant is entitled or able, in the circumstances which have arisen, to look to any other assistance; and, if so, what is the source and extent of such expected assistance.
6. Particulars of—

    Number in family.
    How many are self-supporting.
    How many are partially dependent.
    How many are wholly dependent.

In 1886 Sir William (now Lord) Armstrong gave a sum of £7,800

to the Scientific Relief Fund, on the understanding that the said fund should be used for remission of fees in cases of urgent necessity. By a Resolution of Council passed December 10, 1889, "the question of the remission of fees to Fellows of the Society in impecunious circumstances is reserved for the sole consideration of the President and Council of the Society, the amount thus from time to time bestowed being communicated to the Scientific Relief Committee."

NATIONAL PHYSICAL LABORATORY.

Her Majesty's Government having agreed to ask Parliament for a grant not exceeding £12,000 for the buildings and equipment of a National Physical Laboratory, and for an annual sum of £4,000 for five years certain as a grant in aid of the expenses of conducting the Institution, the appended scheme for the organization and management of the Laboratory has been drawn up by the Royal Society and approved by Her Majesty's Government.

Scheme of Organization.

1. The name of the Institution shall be the National Physical Laboratory. The Kew Observatory shall be incorporated therewith.

2. The ultimate control of the Institution shall be vested in the President and Council of the Royal Society, who in the exercise thereof may from time to time issue such directions as they may think fit to the General Board and Executive Committee hereinafter described. The President of the Royal Society shall be the Chairman of the Governing Body as hereinafter defined. The income and all other property of the Institution shall be vested in the Royal Society for the purposes of the Institution.

3. For the present, and until otherwise ordered by the President and Council of the Royal Society, with the approval of H.M. Treasury, there shall be a Governing Body for the Institution, consisting of a General Board and an Executive Committee, the constitution and duties of which shall be as hereinafter defined. Provided always that the Permanent Secretary of H.M. Board of Trade shall be *ex officio* a member of the Governing Body, and that the choice of members of the Governing Body, or of any Committee thereof, shall not be confined to Fellows of the Royal Society.

4. The General Board shall consist of the President, Treasurer, and Secretaries of the Royal Society, the Vice-Chairman of the

Board (appointed as defined below by the President and Council of the Royal Society), the Permanent Secretary of the Board of Trade, and of thirty-six ordinary members.

Twenty-four of the ordinary members shall be appointed by the President and Council of the Royal Society; of the remaining twelve ordinary members, two shall be nominated for appointment by the Council of each of the following Institutions, as being fitted to represent commercial interests in connection with the Laboratory:—

The Institution of Civil Engineers.
The Institution of Mechanical Engineers.
The Institution of Electrical Engineers.
The Iron and Steel Institute.
The Institution of Naval Architects.
The Society of Chemical Industry.

In the selection of ordinary members of the General Board care shall be taken that Scotland and Ireland are represented.

Any person not being already a member of the General Board who shall become a member of the Executive Committee, shall be a member of that Board during his tenure of office on the Executive Committee, but shall be regarded as an additional, and not as an ordinary, member of the Board.

5. The Executive Committee shall consist of the President, Treasurer, and one of the Secretaries of the Royal Society; the Vice-Chairman of the Executive Committee (appointed as defined below); the Permanent Secretary of the Board of Trade; six persons appointed by the President and Council of the Royal Society from among those who are members of the Kew Observatory Committee at the time when the Kew Observatory is incorporated in the National Physical Laboratory (two of these six persons shall retire at the end of every two years, and vacancies occurring amongst them by retirement or otherwise shall not be filled up); and of twelve ordinary members.

The ordinary members shall be nominated by the President and Council of the Royal Society, but one-half shall be chosen from among those members of the General Board who have been nominated as fitted to represent commercial interests on that Board.

Those members of the Executive Committee who are Fellows of the Royal Society, shall be appointed by the President and Council to be the Gassiot Committee of the Royal Society.

6. The Vice-Chairman of the General Board shall be appointed by the President and Council of the Royal Society, and shall also be Vice-Chairman of the Executive Committee. He shall hold office

for six years, and shall be eligible for re-appointment, but shall not hold office for more than twelve years.

7. At least one-sixth of the ordinary members of the General Board and of the Executive Committee shall retire annually.

In the case of the General Board, the retiring ordinary members shall be those who have not attended a meeting of the Board for two years, together with so many other members of the Board, selected by seniority, as may be necessary to bring the number of retiring members up to one-sixth of the whole number of ordinary members of the Board.

In the case of the Executive Committee, the retiring ordinary members shall be those who have not attended one-half of the meetings of the Committee during the previous year, together with so many other members of the Board, selected by seniority, as may be necessary to bring the number of retiring members up to one-sixth of the whole number of ordinary members of the Board.

No retiring member of the General Board or of the Executive Committee shall be eligible for re-appointment until at least one year has elapsed from the date of his retirement.

The President and Council shall have power to remove from the General Board and from the Executive Committee any member of either whom they may judge to be disqualified.

Vacancies on the General Board or on the Executive Committee due to death, resignation, or removal by the President and Council of the Royal Society, shall be filled by the President and Council of the Royal Society, provided always that—

(1) Any person so appointed shall, for the purposes of the regulations for retirement from the Board or Committee, be regarded at the time of his appointment as having served for the same period as the member to whose place he succeeds.

(2) If the vacancy on the General Board be caused by one of the persons nominated as fitted to represent commercial interests ceasing to be a member of the Board, the President and Council of the Royal Society shall choose his successor from among a list of names recommended by the Councils of the Institutions named in Section 4.

(3) If a vacancy on the Executive Committee be caused by one of the persons nominated as fitted to represent commercial interests ceasing to be a member of the Committee, his successor shall either be selected from among those members of the General Board who were nominated as fitted to represent commercial interests, or shall be nominated by the President and Council of the Royal Society after consultation with the Councils of the Institutions named in Section 4.

The President and Council of the Royal Society shall determine the order of the seniority of the members of the first General Board and of the first Executive Committee for the purposes of the regulations for retirement.

The Executive Committee.

8. The Executive Committee shall have the immediate management of the National Physical Laboratory; shall appoint and dismiss the officials, except the Director; and shall determine the nature of the work to be undertaken from time to time.

The General Board.

9. A meeting of the General Board shall be held in October, at which the Executive Committee shall present a report on the work and finances of the National Physical Laboratory during the year ending on the preceding September 30. Copies of this report shall be circulated among the members of the General Board at least one week before the meeting, and after the meeting shall be forwarded to the President and Council of the Royal Society, together with any further report, resolutions, or recommendations which may be added by the General Board.

The Executive Committee shall also lay before the General Board at its meeting in October a statement as to the work which it is proposed to undertake in the Laboratory during the ensuing year. This statement shall be circulated among members of the Board at least a week before the meeting; and the General Board may make such recommendations relative to the statement, or to the future work of the National Physical Laboratory, as they may think fit.

These recommendations shall be laid before the Executive Committee for their consideration.

Sub-Committees.

10. The Executive Committee may from time to time appoint Sub-Committees, of which the members shall not necessarily be members of the Executive Committee or of the General Board, either to superintend or to assist in certain specified investigations, or to superintend some department of the National Physical Laboratory.

The Director.

11. The Director of the National Physical Laboratory shall be appointed by the President and Council of the Royal Society after consultation with the Executive Committee, on such terms as the President and Council may determine, and shall be removable by

the President and Council. He shall be responsible to, and shall take instructions from, the Executive Committee, but, subject to such instructions, he shall have the sole direction and control of the officials of the National Physical Laboratory and of the work done within it.

The Executive Committee may delegate its power of appointing and dismissing the officials of the Institution to the Director in such cases as it may think fit.

The Director shall neither be allowed nor be called upon to undertake work not connected with the National Physical Laboratory, except with the consent of the Executive Committee.

Finance.

The Royal Society shall open a banking account, to be called "The National Physical Laboratory Account of the Royal Society," into which all sums received by the Executive Committee for the purposes of the Institution shall be paid. The Treasurer of the Royal Society shall also pay into this account all sums received by him for the said purposes, after deducting therefrom such amounts as he shall be directed by the President and Council, with the approval of the Treasury, to retain for the purpose of defraying any expenses which the Royal Society may incur in the exercise of its control of the Institution.

The Executive Committee shall be empowered to draw on this account for the purposes of the Institution by cheques signed by such members of the Executive Committee as may be authorised by the Committee to do so.

Legal Proceedings.

Any legal proceedings with regard to the affairs of the Institution, which it may become necessary to institute or defend, shall be instituted or defended by the Solicitors of the Royal Society, in the name and on behalf of the Royal Society upon the instructions of the Executive Committee, but no such proceedings shall be instituted or defended without the order of the President and Council of the Royal Society.

The Kew Observatory Committee of the Royal Society.

"The Kew Observatory Committee of the Royal Society," incorporated under the Companies Act, 1867, shall be wound up; and the property thereof shall be held by the Royal Society for the purposes of the Institution.

GENERAL BOARD OF THE NATIONAL PHYSICAL LABORATORY.

The President of the Royal Society
The Vice-Chairman of the Board (Lord Rayleigh)
The Treasurer of the Royal Society
The Secretaries of the Royal Society
The Permanent Secretary of the Board of Trade
— *Ex officio.*

Sir W. H. Preece, K.C.B., F.R.S.
Sir J. Wolfe-Barry, K.C.B., F.R.S.
— Nominated by the Inst. Civil Engineers.

Sir William White, K.C.B., F.R.S.
Sir Edward Carbutt, Bart.
— Nominated by the Inst. Mechanical Engineers.

Mr. Alexander Siemens
Professor W. E. Ayrton, F.R.S.
— Nominated by the Inst. Electrical Engineers.

Mr. George Beilby
Mr. Walter F. Reid
— Nominated by the Society of Chemical Industry.

Sir Wm. Roberts-Austen, K.C.B., F.R.S.
Sir F. Abel, Bart., K.C.B., F.R.S.
— Nominated by the Iron and Steel Institute.

Sir Nathaniel Barnaby, K.C.B.
Mr. J. T. Milton
— Nominated by the Institute of Naval Architects.

Sir W. de W. Abney, R.E., K.C.B., F.R.S.
Professor W. G. Adams, F.R.S.
Capt. E. W. Creak, R.N., F.R.S.
Professor Carey Foster, F.R.S.
Mr. Francis Galton, F.R.S.
Professor J. Perry, F.R.S.
The Earl of Rosse, F.R.S.
Dr. R. H. Scott, F.R.S.
Mr. W. N. Shaw, F.R.S.
Sir R. Strachey, G.C.S.I., F.R.S.
Sir Wm. Wharton, K.C.B., F.R.S.
— Members of the Kew Observatory Committee.

Professor R. B. Clifton, F.R.S.
Professor O. Lodge, F.R.S.
Sir A. Noble, K.C.B., F.R.S.
Professor A. Schuster, F.R.S.
Professor J. J. Thomson, F.R.S.
Dr. T. E. Thorpe, For. Sec. R.S.
Lord Kelvin, F.R.S.
— Members of the Executive Committee appointed by the President and Council of the Royal Society.

Dr. Buchan, F.R.S.
Mr. R. Crompton
Professor Fitzgerald, F.R.S.
Professor J. Joly, F.R.S.
Mr. C. E. Stromeyer
Mr. Hugh Bell
— Nominated by the President and Council of the Royal Society.

EXECUTIVE COMMITTEE OF THE NATIONAL PHYSICAL LABORATORY.

The President of the Royal Society The Vice-Chairman of the General Board of the Laboratory The Treasurer of the Royal Society A Secretary of the Royal Society (Professor A. W. Rücker) The Permanent Secretary of the Board of Trade	*Ex officio.*

VICE-CHAIRMAN OF THE COMMITTEE.

Lord Rayleigh, F.R.S.

OTHER MEMBERS OF THE EXECUTIVE COMMITTEE.

Sir W. de W. Abney, F.R.S. Capt. Creak, F.R.S. Professor Carey Foster, F.R.S. Mr. F. Galton, F.R.S. Professor Perry, F.R.S. Gen. Sir R. Strachey, F.R.S.	From among the Members of the Kew Observatory Committee.
Sir John Wolfe-Barry, F.R.S. Sir Edward Carbutt Mr. A. Siemens Sir William Roberts-Austen, F.R.S. Mr. G. Beilby Sir Nathaniel Barnaby	From among those Members of the General Board nominated by the technical Societies named in the Scheme.
Professor Clifton, F.R.S. Professor O. Lodge, F.R.S. Sir Andrew Noble, F.R.S. Professor A. Schuster, F.R.S. Professor J. J. Thomson, F.R.S. Dr, Thorpe, For Sec. R.S.	Nominated by the President and Council of the Royal Society.

October, 1899.

REGULATIONS FOR ADMINISTERING THE GOVERNMENT GRANT FOR SCIENTIFIC INVESTIGATIONS.

I.

1. The Government Grant shall be administered by a General Committee, consisting of the President and Council of the Royal Society for the time being, of the following *ex officio* Members:—

The President of the Royal Society of Edinburgh and one other Representative,
The President of the Royal Irish Academy and one other Representative,
The Presidents of—
The British Association,
The London Mathematical Society,
The Royal Astronomical Society,
The Physical Society,
The Institution of Civil Engineers,
The Institution of Mechanical Engineers,
The Institution of Electrical Engineers,
The Chemical Society,
The Iron and Steel Institute,
The Geological Society,
The Royal Geographical Society,
The Linnean Society,
The Zoological Society,
The Anthropological Institute,
The Royal College of Physicians,
The Royal College of Surgeons,

and of the Members, for the time being, of the several Boards hereinafter spoken of.

2. Seven Boards shall be established, viz.:—

A. For the consideration of Applications relating to Mathematics, Mathematical Physics, Crystallography and Mathematical Astronomy.

B. For the consideration of Applications relating to Experimental Physics, Observational Astronomy, and Meteorology.

C. For the consideration of Applications relating to Chemistry and Metallurgy.

D. For the consideration of Applications relating to Geology, Palæontology, Mineralogy, and Geography.

E. For the consideration of Applications relating to Botany.

F. For the consideration of Applications relating to Zoology and Comparative Anatomy.

G. For the consideration of Applications relating to (Animal) Physiology and Medical Subjects.

3. Each Board shall consist of eight members, to be appointed by the President and Council of the Royal Society, Scotland and Ireland being as far as possible represented on each Board, and each member shall serve for four years, so that two retire annually, and be not eligible for re-appointment on the occasion of their retiring. Should a vacancy occur by reason of death or otherwise, at any intermediate time, the Council shall appoint a person to fill the vacancy, and the person so appointed shall retire at the time the member whose place he fills would have retired had he continued until then to be a member, but if he have not served more than two years shall be eligible for re-appointment.

4. The President and Council of the Royal Society shall appoint a member of each Board to be Chairman of the Board. All communications made to and by the Board shall be made through the Chairman, who shall be held responsible for the management of the business of the Board, and who shall have a second or casting vote. When a Chairman is unable to perform the duties of the Chair, he shall appoint a member of the Board to act as his deputy, and to exercise his powers.

II.

5. In order to meet any extraordinary demands which may be made upon the Grant, a Reserve Fund shall be gradually accumulated, but so that it shall not at any time exceed £2,000.

6. A Grant, the payment of which is intended to be completed within the twelvemonth following upon the meeting of the Committee at which the Grant was made, shall be called an "ordinary" Grant. The Committee shall, however, if they see fit, make Grants for "personal" or other expenditure, each of which may extend over a period not exceeding three years, but in no case shall such a personal Grant exceed £300 per annum. For this purpose the Committee may, in any one year, reserve from the Fund of the year an amount sufficient to cover the payment during the period for which the Grant has been made, the continuance of the payment of the instalments of such Grants to be conditional on the recipients furnishing, as hereinafter provided, evidence satisfactory to the Committee that the object of the Grant is being properly carried out. Such Grants shall be called "extended" Grants.

III.

7. Adequate notice shall be given in the public papers each year that applications for Grants must be sent in to the Royal Society

not later than the last day of January, and no applications received after that date shall be considered by the Committee of that year.

8. Each applicant shall be required to furnish information under the following heads:—

a. The nature of the research in which he desires to engage, and of the scientific results expected to follow therefrom.

b. The amount asked for.

c. Whether he has received any previous Grant from any source for the same object, and if so, with what results.

d. Whether any portion of the Grant is to be devoted to his own personal expenses.

e. What apparatus, if any, of permanent value he will require; so that any instruments, already at the disposal of the Committee, may be utilised.

9. As soon as possible after February 1st in each year, the Secretaries of the Royal Society shall cause to be drawn up a list of all the applications, arranged, according to the nature of the research in each application, in classes corresponding to the above-mentioned Boards, and shall cause such list to be distributed to all Members of the Committee. This list shall contain a brief statement of the information received under Clause 8.

10. The Secretaries of the Royal Society shall further cause to be sent to the Chairman of each Board a list of the applications belonging to the class corresponding to his Board, together with any other information, letters, documents, &c., which may have been furnished by the several applicants.

11. Each Board, having taken into consideration the applications submitted to it, making such use of correspondence between Members of the Board as may be desirable for the purpose, shall send to the Secretaries of the Royal Society, some day in May to be determined each year by the President and Council of the Royal Society, a written Report, stating, with reference to each such application, whether they recommend the acceptance of it in part or in whole, or the rejection of it; and the Secretaries of the Royal Society shall cause the Reports of the several Boards to be distributed as soon as possible to all Members of the Committee.

12. Should any application appear to the Secretaries of the Royal Society to relate to more than one Board, they shall, with the approval of the President of the Royal Society, refer the application to the several Boards to which it appears to relate. In such cases the Chairman of one of the Boards concerned shall, on the nomination of the President of the Royal Society, be requested to take charge of the application, to be responsible for its being laid before the Boards concerned, and to present the Report of those Boards on

the application at the same time that he presents the usual Report of his own Board.

13. It shall be in the power of any Board to initiate an inquiry and to recommend a Grant for the purpose, and such a recommendation having been reported to the Committee with the other recommendations of the Board, shall take its place among applications recommended to the Committee for acceptance, in spite of application not having been made in the ordinary way.

14. The Committee shall meet on the third Wednesday (or, if that fall in Whitsun Week, the fourth Wednesday) in May, at which meeting the Reports of the Boards shall be read, considered (the Chairman of each Board, or in his place some other Member of it, giving such explanations with regard to the decisions of the Board as may seem desirable), and voted upon. The voting shall be by show of hands, unless any Member demands a ballot, in which case it shall be by ballot.

15. In the case of applications which have been recommended by the appropriate Board, or recommendations initiated by any Board, the voting in Committee shall be by simple majority of those present, except in the case of "extended" Grants coming under Clause 6, which Grants shall require the assent of two-thirds of those present.

16. Applications which have been rejected by the appropriate Board shall not be reconsidered in Committee except with the consent of two-thirds of those present, and any applications so reconsidered shall not be granted by the Committee otherwise than by a majority of two-thirds; likewise a proposal to increase the amount of any Grant made by a Board shall not be considered in Committee except with the consent of two-thirds of those present, and the increase so considered shall not be granted by the Committee otherwise than by a majority of two-thirds.

17. The Committee shall have power to place each year at the disposal of the President and Council of the Royal Society, a sum not exceeding £500 to meet any pressing demands upon the Fund which may be made between the annual meetings of the Committee.

18. The President of the Royal Society shall further have power, in case he is of opinion that there is urgency for an immediate Grant of a sum too large to be provided by the Fund referred to in 17, and necessitating a call upon the Reserve Fund, to summon a Special Meeting of the Committee, who, if they see fit, shall decide on such Grant, provided always that due notice of such meeting, with a statement of the purpose for which it is called, be sent to each Member of Committee fifteen days before the date fixed for the meeting.

IV.

19. All Grants shall be subject to the following conditions, and every applicant shall, on his applying, be duly informed of these conditions:—

i. That all instruments, specimens, objects, or materials of permanent value, whether purchased or obtained out of, or by means of, the Grant, or supplied from among those at the disposal of the Committee, are to be regarded, unless the Committee decide otherwise, as the property of the Government, and are to be returned by the applicant, for disposal according to the orders of the Committee, at the conclusion of his Research, or at such other time as the Committee may determine.

ii. That every one receiving a Grant shall furnish to the Committee, on or before the 31st of January following upon the allotment of the Grant, a Report (or, if the object of the Grant be not then attained, an interim Report, to be renewed at the same date in each subsequent year until a final Report can be furnished), containing (*a*) a brief statement showing the results arrived at, or the stage which the inquiry has reached; (*b*) a general statement of the expenditure incurred, accompanied, so far as is possible, with vouchers; (*c*) a list of the instruments, specimens, objects or materials, purchased or obtained out of the Grant, or supplied by the Committee, which are at present in his possession; and (*d*) references to any Transactions, Journals, or other publications in which results of the Research have been printed.

iii. That when a Grant is asked for a definite Research, for which an estimate can be obtained, applicants are required, with their applications, to furnish such an estimate.

iv. That when an application is for a Grant to two or more persons to act as a Committee for the purpose of carrying out some scientific object, the application shall state which Member of the proposed Committee is willing to act as Secretary, to be responsible for furnishing the Report, for receiving and disbursing the money, and in general for the conduct of the business of the Committee.

v. That Grants shall lapse at the end of two years from the date of allotment, if application for payment be not made within that time.

vi. That papers in which results are published which have been obtained through and furnished by the Government Grant, should contain an acknowledgment of that fact.

The Committee shall further have power to attach to any Grant any other conditions which they may think desirable.

20. Every applicant to whom a Grant is made shall, before any of the Grant is paid to him, be required to sign an engagement (which may be incorporated in the receipt for the money) that he is prepared to carry out the general conditions applicable to all Grants, as well as any conditions which may be attached to his particular Grant.

21. Printed copies of the Reports, provided for by Regulation 19, § ii, shall each year, so soon as possible after January 31, be submitted to the several Boards; and it shall be the duty of each Board to examine the Reports relating to Grants recommended by it, and to report to the Committee (or, in case of urgency, to the Council of the Royal Society) any deficiencies therein, or any action relating thereto which the Board thinks desirable.

22. In the case of a Grant recommended by a Board being for the purpose of enabling the applicant to collect by means of the Grant, or part of it, specimens, objects, or materials of permanent value, the Board shall, whenever it is able to do so, add to its recommendation conditions as to the final disposal of such specimens, objects, or materials.

23. When an application is for a Grant to two or more persons to act as a Committee for the purpose of carrying out some scientific object, the application shall state which Member of the proposed Committee is willing to act as Secretary, to be responsible for furnishing the Report, for receiving and disbursing the money, and in general for the conduct of the business of the Committee.

24. The recipient of an "extended" Grant shall make to the Board which recommended the Grant, half-yearly, or, if the Board desire it, oftener, such Reports as the Board may determine concerning the way in which the object of the Grant is being carried out; and each such recipient shall, on receiving notice that the Grant has been made to him, be informed of his duty to make such Reports, and shall express in writing his willingness to do so. Should any Board be of opinion, after receiving such Reports, that the object of the Grant is not being properly carried out, they shall report the same to the next meeting of the Committee. The Chairman of the Board shall move at the meeting of the Committee that the Grant be discontinued, and if the Committee by a majority approve of the Grant being discontinued, it shall be discontinued.

V.

25. The duties of Clerk to the Committee and other business incidental thereto may be performed by the staff of the Royal

Society; and the sum of £200 shall be yearly placed at the disposal of the Council for salaries and incidental purposes.

26. A Schedule shall be kept of all instruments, specimens, &c., of permanent value, in furtherance of Regulation 19, and of Clause *e* of Regulation 8.

27. A Professional Accountant shall be employed to audit the accounts in chief, and to conduct the preliminary examination of the detailed accounts and vouchers. Such accountant shall be instructed to submit to the Chairman of the appropriate Boards the cases concerning which he is not satisfied; and the Chairman of a Board shall be requested to examine, with the assistance of one or more Members of his Board, any such case so submitted to him, and to take such action as may seem to him desirable.

APPENDIX TO THE GOVERNMENT GRANT REGULATIONS.

I.

Instructions for the Government Grant Boards.

(*Minutes of Council, March* 15, 1894.)

1. Each Chairman has authority to summon his Board, whenever he thinks fit (in addition to any Meeting or Meetings of the Board which may be appointed by the Council), to meet either at the Rooms of the Royal Society, during the hours specified in the Statutes (chap. xiv, § 7), or at such other place as he may deem desirable.

2. The summonses are to be issued by the Clerk at the direction of the Chairman.

3. Any four members of a Board are to be a quorum of that Board; but the decisions arrived at at a Meeting of a Board at which less than four members are present shall be valid, if subsequently agreed to in writing by not less than five members in all.

4. It is desirable that each year a Meeting of each Board should be held at the Society's Rooms soon after the receipt by the Chairman of the applications, and that another Meeting to come to final decisions on the applications should be held, also at the Society's Rooms, on the day fixed by the Council; but the Chairman may, if he finds it desirable, change the day of the latter Meeting, and he may even omit the one or the other of these Meetings, should he judge the one or the other to be unnecessary.

5. If the Chairman of a Board, on receiving a list of applications under Regulation 10, shall find that any application on that list is, in

his opinion, more appropriate to another Board than his own, or that any application which ought, from its nature, to have been referred to a Board or to Boards besides his own, is referred only to his own Board, or that an application proper to his Board has been referred to another Board, he shall at once report the same to the Secretaries of the Royal Society.

6. The Chairman of a Board may authorise the transfer of any instrument, specimen, &c., obtained by means of a Government Grant, and no longer needed by the person by whom it was obtained or to whom it was assigned, to any other person applying to the Government Grant Committee for the loan of the instrument, specimen, &c., if in his judgment such a transfer is desirable. He shall in each case report his having done so to the Secretaries of the Royal Society.

7. The Chairman of each Board is expected to see that the Annual Reports* furnished by Grantees give an adequate account of the work done and the results attained, and in cases where the Reports are inadequate, to inform the Clerk of the fact in order that he may communicate with such Grantees.

8. The Chairman of a Board is requested to examine, with the assistance of one or more members of his Board, any case submitted by the Professional Accountant in pursuance of Regulation 27, and to take such action as may seem to him desirable.

II.

INSTRUCTIONS FOR A COMMITTEE APPOINTED FOR THE PURPOSE OF ADMINISTERING A GRANT UNDER SECTION 23 OF THE GOVERNMENT GRANT REGULATIONS.

(*Minutes of Council, February* 22, 1895.)

1. The Secretary of the Committee has authority to call a Meeting of the Committee whenever he thinks desirable, either at the Rooms of the Royal Society, during the hours specified in the Statutes (chap. xiv, § 7), or at such other place as he may deem desirable.

2. The summons for each such Meeting shall be issued by the Clerk, from the Society's Apartments.

3. To constitute a quorum, at any meeting of the Committee, at least one-half of the Members of the Committee, the Secretary being one, must be present.

4. The provisions of Regulation 19 apply in all particulars to a Committee as well as to an individual applicant, and every Com-

* By "Report" is not meant a complete scientific exposition of the inquiry, but such a statement as will show that the Grantee has expended the money for the purpose mentioned in his Application, and will briefly indicate to what extent he has attained the objects of the inquiry.

mittee receiving a Grant is to continue (subject to any decision to the contrary by the Council of the Royal Society, or by the General Committee) until such time as the final Report upon their research has been furnished.

5. When a Committee is re-appointed, with or without change as to the persons composing it, for continuing a research, and receiving a new Grant, it is to be considered a new Committee for all purposes of expenditure and reporting, and is in no way responsible for expenses incurred by its predecessor.

The above instructions are intended only for the cases in which a Committee is especially constitnted in order to receive a Grant. Grants may be made to already existing Committees established independently of any application for a Grant. In such cases the above instructions are not intended to apply, and the procedure of meetings, constitution of quorum, &c., of such a Committee must be determined in each case by the Committee itself. In all such latter cases the Chairman or Secretary of the Committee, or some other person, must be authorised by the Committee to be the responsible representative of the Committee in question before the Government Grant Committee, to make application to receive moneys, to furnish reports, &c., &c.

December 1, 1898.

GOVERNMENT GRANT BOARDS, 1900.

Board A.

Chairman—Dr. Larmor.

	Retire March 1st.
**Prof. Elliott, Dr. Hobson*	*1900*
Prof. Chrystal, Dr. Larmor	1901
Prof. Forsyth, Prof. Greenhill	1902
Mr. Basset, Prof. H. H. Turner	1903
Prof. Burnside, Prof. Love	1904

Board B.

Chairman—Sir William Abney.

Mr. C. V. Boys, Sir W. Huggins	*1900*
Sir Wm. Abney, Prof. Fitzgerald	1901
Mr. S. Bidwell, Lord Kelvin	1902
Prof. Fleming, Prof. Carey Foster	1903
Prof. Callendar, Mr. McClean	1904

* Members whose names are in italics serve only *until* March 1, 1900. The two members named last on each Board serve only *from* March 1, 1900.

BOARD C.

Chairman—Dr. Thorpe.

	Retire March 1st.
Prof. Armstrong, Prof. J. E. Reynolds	*1900*
Prof. Crum Brown, Dr. Thorpe	1901
Prof. Dunstan, Sir W. C. Roberts-Austen	1902
Prof. Liveing, Prof. Ramsay	1903
Prof. McLeod, Dr. H. Müller	1904

BOARD D.

Chairman—Dr. Blanford.

Dr. H. Hicks, Prof. Sollas	*1900*
Dr. Blanford, Mr. Teall	1901
Prof. Judd, Prof. Dawkins	1902
Mr. L. Fletcher, Mr. J. E. Marr	1903
Mr. Hudleston, Lieut.-Gen. McMahon	1904

BOARD E.

Chairman—Prof. Vines.

Prof. Balfour, Dr. D. H. Scott	*1900*
Prof. J. R. Green, Prof. Vines	1901
Mr. Gardiner, Prof. Oliver	1902
Sir E. Fry, Mr. G. Murray	1903
Mr. Seward, Prof. J. W. H. Trail	1904

BOARD F.

Chairman—Mr. Godman.

Mr. Beddard, Prof. Herdman	*1900*
Prof. Hickson, Prof. Macalister	1901
Mr. Godman, Prof. J. C. Ewart	1902
Mr. Elwes, Prof. Poulton	1903
Prof. A. Newton, Prof. Weldon	1904

BOARD G.

Chairman—Prof. Ferrier.

Dr. Gaskell, Prof. Halliburton	*1900*
Prof. McKendrick, Prof. Sherrington	1901
Prof. W. Watson Cheyne, Dr. Waller	1902
Prof. Ferrier, Prof. Schäfer	1903
Dr. Langley, Dr. Sidney Martin	1904

Account of the Appropriation of the Sum of £4,000 (the Government Grant) annually voted by Parliament for Scientific Investigations.

April 1, 1898, to March 31, 1899.

	£	s.	.
Ernest W. Brown, for the Calculation of the Inequalities produced in the Motion of the Moon by the Action of the Sun	100	0	0
Dr. G. Johnstone Stoney, for the Calculations of the Orbits of Leonids	22	0	0
H. H. Turner, for Measurement and Reduction of Plates for the Astrographic Catalogue taken at the University Observatory, Oxford	150	0	0
A. M. W. Downing, for continuation of the Calculations for a Revised Edition of Taylor's Madras Catalogue of Stars	100	0	0
Prof. K. Pearson, for a Research on the Amount of Collateral Heredity by Measurement of the Cephalic Index of Pairs of Brothers, Pairs of Sisters, and Pairs of Brother-sisters in Elementary Schools	25	0	0
W. F. Denning, for (*a*) the Observation of Meteoric Streams, and (*b*) Search for New Comets (*personal*)	25	0	0
Prof. J. Milne, to continue Recording Earthquakes which have originated at great distances and to assist in the General Seismic Survey of the World	25	0	0
Prof. J. C. Bose, for Further Researches in Electric Radiation	10	0	0
Prof. G. M. Minchin, for the Electrical Measurement of Starlight	10	0	0
Meteorological Council, for a Research on the Best Methods of Dealing with the Records of Atmospheric Electricity obtained at Kew Observatory	200	0	0
S. W. Richardson, for a Research on the Effect of Temperature upon the Magnetic Properties of Series of Alloys of Iron and other Metals	10	0	0
Prof. Fitzgerald, for a Series of Observations of the Magnetic Elements at the Meteorological Observatory, near Valencia, in co. Kerry	110	0	0
Carried forward	£787	0	0

Brought forward.....	£787	0	0
J. L. E. Dreyer, for the Purchase of a Micrometer-microscope for Measurement of Nebulæ and Adjacent Stars on Photographic Plates	70	0	0
Prof. Schuster, for a Critical Investigation of Periodicities in the Magnetic Elements for Periodic Times between 20 and 30 days	25	0	0
P. L. Gray, for a Detailed Magnetic Survey of the District between the Malverns and Charnwood Forest ...	50	0	0
Dr. C. H. Lees, for Investigations on the Thermal Conductivities of Substances and their Variation with Temperature	15	0	0
J. J. Manley, for a Research on the Refractive Indices of Pure Nitric Acid at Various Temperatures and of Strengths varying from 1 to 100 per cent.	25	0	0
Prof. P. F. Frankland, for Further Research on the Relationship between Optical Activity and Chemical Constitution	100	0	0
Dr. J. Joly, for a Research on the Metamorphosis of certain Rocks and Minerals when subjected to Conditions of Prolonged High Pressure and Temperature	80	0	0
L. G. Radcliffe, for an Investigation of Carthamin, the Red Colouring Matter contained in Safflower.....	20	0	0
J. J. Sudborough, for Continuation of Researches on (*a*) Diortho-substituted Benzoic Acids.....	25	0	0
Drs. W. Trevor Lawrence and J. F. Thorpe, for the Examination of Ergot from the chemical point of view, with the object of Isolating the Substance to which the Physiological Action of the Drug is due.....	25	0	0
W. H. Perkin, Jun., for a Research on the Constitution of Camphoric Acid, Camphor, and other Allied Substances	100	0	0
Prof. Japp, for an Investigation of the Reactions of Ketones, Diketones, and Allied Compounds, and of the Alkyl Derivatives of Amarine	75	0	0
H. J. H. Fenton, for Further Research on Dioxymaleic and Dioxytartaric Acids and their Derivatives	70	0	0
Dr. A. W. Gilbody, for Further Research on Braziline	25	0	0
Prof. F. S. Kipping, for Further Research on Cycloid Ketones	40	0	0
C. F. Cross, for Researches on (1) Carbohydrates of the Cereal Straws; (2) Carbohydrates and Hydrogen Peroxide.....	75	0	0
Carried forward.....	£1,607	0	0

Brought forward.....	£1,607	0	0
H. R. Le Sueur and Dr. A. W. Crossley, for the Chemical Examination of the Constituents of the Oils from the following Plants:—*Carthamus tinctorius*, *Anemone Mexicana*, and *Buchanania latifolia*	20	0	0
Henry Woods, for a Monograph of the Cretaceous Lamellibranchs of England	50	0	0
Dr. H. Hicks (for a Committee), for continuation of the Exploration of the Ty Newydd Cave	30	0	0
Prof. Seeley, for a Research on the Theriodont and Labyrinthodont Reptiles of the Karroo Rocks of South Africa.....	25	0	0
Sir W. T. Thiselton-Dyer, for the Employment of a Draughtsman to draw the various Sugar-Canes at present cultivated in British Possessions, with a view to establishing a Uniform Nomenclature	100	0	0
C. A. Barber, for the Examination of Sections of Fossil Coniferous Wood from Shanklin, I.W.	10	0	0
Rev. R. P. Murray, for Botanical Research in the Canary Islands with a view to compiling a Flora of the Islands	33	0	0
Prof. Farmer, for a Research on the Respiration of Plants under Various Conditions.....	25	0	
W. Gardiner, in aid of his work upon the Structure and Construction of the Cell Wall	100	0	0
Evolution (Animals and Plants) Committee (per Prof. Weldon, for Further Investigations into the Measurable Characteristics of Plants and Animals.....	200	0	0
G. D. Haviland, for Researches on Anatomical Differences, Instincts, and Variation in Termites.....	50	0	0
Prof. E. Ray Lankester, for a Research on the Structure of the Gills of Lamellibranch Molluscs.....	150	0	0
W. R. Ogilvie-Grant, to visit the Island of Socotra and make a thorough Exploration of the Fauna.....	50	0	0
E. W. L. Holt, for a Revision of the Rajidæ, with Especial Reference to those of Great Britain and Northern Europe	50	0	0
Prof. T. W. Bridge, for Further Investigations in the Morphology of Fishes	30	0	0
J. P. Hill, for Researches into the Embryology of Monotremes and Marsupials.....	100	0	0
Carried forward.....	£2,630	0	0

Brought forward.....	£2,630	0	0
Prof. J. C. Ewart, for a Research on the Development of the Horse and Comparative Anatomy of the Equidæ...	100	0	0
W. Eagle Clarke, for Observations on the Migrations of Birds at the Island of Ushant (£10 *personal*)	25	0	0
Prof. Herdman and F. J. Cole, for the continuation and completion of a Research on the Budding and Formation of Colonies in Compound Ascidians.....	10	0	0
Dr. V. Harley, for Experiments into the Respiratory Gas Exchange from the Tissues and Lungs in cases of Pneumothorax and Pleurisy.....	40	0	0
E. H. Starling, for Researches on (1) the Physiology of Unstriated Muscles in Mammals; (2) the Osmotic Pressure of Proteids and other Colloids in Solution; (3) on the Functions of the Glomeruli and Tubules of the Kidney in the Secretion of Urine	50	0	0
Dr. W. D. Halliburton, for Further Researches on the Cerebro-Spinal Fluid and Absorption of Hæmoglobin in the Alimentary Tract	50	0	0
Dr. L. Hill, for Researches on (1) the Cortical Circulation in Monkeys; (2) the Effects on the Circulation of Exposure to Increased Atmospheric Pressures	30	0	0
Dr. R. Row, for Continuation of a Research on the Physiological Action of Piperidine, Nicotine, and their Derivatives.....	20	0	0
B. Moore, for Continuation of Researches on (1) the Chemistry of Digestion of Fats, &c.; (2) the Comparative Chemistry of the Suprarenal Gland.....	30	0	0
H. L. Barnard, for a Research on the Exact Mode of Action of Cardiac Drugs, and more especially of Anæsthetics.....	20	0	0
Professor J. T. Cash, for the Investigation of the Pharmacological Action of Certain New Derivatives of Aconitine, &c.....	30	0	0
Dr. R. Hutchinson, for Determination of the Mutual Relations (if any) of the Thyroid Gland and the Reproductive Organs, and for Further Investigations into the Chemistry of the Thyroid Gland.....	30	0	0
Dr. G. Mann, for a Research on the Alterations in the Appearance of the Nerve Cells, as the Result of Changes in their Nutrition	20	0	0
Carried forward.....	£3,085	0	0

Brought forward.....	£3,085	0	0
Dr. W. H. Thompson, for Further Investigation into the Physiological Effects produced by Peptone and its Precursors, when introduced into the Circulation	30	0	0
Professor E. A. Schäfer, for an Investigation into the Functions of the Cerebral Cortex, with Special Reference to the question of Sensory Localisations and Paths	25	0	0
M. S. Pembrey, for a Continuation of the Research upon the Regulation of Temperature	40	0	0
Miss Sarah C. M. Sowton, for the Investigation of the Influence of Various Reagents on the Electrical Reactions of Medullated Nerve.....	20	0	0
Dr. T. G. Brodie, for a Research on the Mode of Formation of Diphtheria Antitoxin and its Chemical Characters.....	25	0	0
Professor Edgeworth David, for the continuation of the Coral Boring at Funafuti	200	0	0
Sir Martin Conway, in Aid of his Expedition to the Andes of Bolivia	100	0	0
Capt. Dowding, to assist a Botanist attached to the Llanos de Cayuan	50	0	0
	£3,575	0	0

Revenue Account.

1898-99.

General Fund.

Cr.

	£	*s.*	*d.*
To Appropriations as above £3,575			
Less grants lapsed 120			
——	3,455	0	0
„ Administrative Expenses	185	11	1
„ Transferred to Reserve Fund.....	443	14	6
„ Balance, Mar. 31, 1899 .	512	4	7
	£4,596	10	2

Dr.

	£	*s.*	*d.*
By Balance, April 1, 1898	368	14	6
„ Parliamentary Grant .	4,000	0	0
„ Miscellaneous Receipts	18	5	0
„ Repayments	209	10	8
	£4,596	10	2

Reserve Fund.

Cr.

	£	*s.*	*d.*
To Balance	529	3	11
	£529	3	11

Dr.

	£	*s.*	*d.*
By Balance, April 1, 1899	85	9	5
„ Transfer from General Fund.....	443	14	6
	£529	3	11

87295

REGULATIONS GOVERNING THE USE OF THE LIBRARY OF THE ROYAL SOCIETY.

1.* The Library shall be open to the Fellows every week-day (exclusive of Good Friday and Easter-eve, of Easter week, of a week at Whitsuntide, and of a week at Christmas), from 11 A.M. to 6 P.M., except on Saturdays, when it shall be open from 11 in the morning to 1 in the afternoon; but during the months of August and September, it shall be closed on week-days other than Saturdays at 4 P.M.

2. Any Fellow may have the loan of any of the printed Books of the Society, excepting such as the Council shall order not to be taken out of the Library; but he shall not be allowed to have in his possession more than ten volumes at a time. The loan of Manuscripts is exclusively vested in the President and Council.

3. A List of all Books and Manuscripts borrowed from the Library of the Royal Society, and of the Fellows of the Society to whom they are lent, shall be kept in the Library.

4. All books whatsoever belonging to the Society, shall be returned at a time to be specified by the Council in each year; and the Library shall be closed for one month after such time, or for such shorter periods as the Council may direct.

5. The value of such Books in the possession of any Fellow as are not returned to the Library, pursuant to the preceding Statute, shall be required to be paid by the person who has so detained them.

6. No persons other than Fellows have the privilege of using the Library, except upon a written introduction from a Fellow, with whom rests the responsibility for all books entrusted to the person introduced. Every such introduction shall be valid only until the 1st August next ensuing.

7. Dictionaries, Cyclopædias, and works of general reference do not circulate.

8. Books of exceptional rarity, size, or value, are only allowed to circulate by special permission of the Council.

9. All books are borrowed subject to recall after one month's interval.

10. All books are returnable to the Library *on the 1st August in each year*, and no books can be borrowed during the month of August.

11. All applications for the use of the Library are to be addressed to the *Assistant Secretary and Librarian*, who is charged with the carrying out of these regulations.

Ordered by the Library Committee at their meeting on the 16th December, 1898.

* Regulations 1—5 are from the Statutes, ch. xiv.

ADDITIONS TO LIBRARY, 1898-99.

Alcock (A.) An Account of the Deep-sea Madreporaria collected by the Royal Indian Marine Survey Ship *Investigator*. 4to. *Calcutta* 1898; A Summary of the Deep-sea Zoological Work of the Royal Indian Marine Survey Ship *Investigator* from 1884 to 1897. 4to. *Calcutta* 1899. From the Author.

Armstrong (Lord), F.R.S. Supplement to Lord Armstrong's Work on Electric Movement in Air and Water, being a Continuation of his Experiments, together with an Extension of them made in concert with Henry Stroud. Folio. *London* 1899. From Lord Armstrong.

Bartholomew's Physical Atlas. Vol. III. Atlas of Meteorology. Edited by Alex. Buchan, F.R.S. Folio. *Westminster* 1899.

Berlin:—Königl. Technische Hochschule Chronik. 1799-1899. 4to. *Berlin* 1899. From the High School.

Bidwell (S.), F.R.S. Curiosities of Light and Sight. 8vo. *London* 1899. From the Author

Bretschneider (E.) History of European Botanical Discoveries in China. 2 vols. and Atlas. 8vo. and folio. *London* 1898. From the Author.

British Association Notes and Queries on Anthropology. Third edition. 8vo. *London* 1899. From the Association.

British Astronomical Association. The Indian Eclipse, 1898. 8vo. *London* 1899. From the Association.

Buitenzorg:—Botanisch Laboratorium. De Localisatie van het Alcaloid in Cinchona Calisaya Ledgeriana en in Cinchona Succirubra. 8vo. *Batavia* 1898 [with coloured plates in large 4to.] From the Laboratory.

Cory (C. B.) The Birds of Eastern North America. Water Birds. Part I. 8vo. *Chicago* 1899. From the Field Columbian Museum.

Cronander (A. W.) On the Laws of Movement of Sea-currents and Rivers. 4to. *Norrköping* 1898. From the Author.

Davison (C.) The Hereford Earthquake of December 17, 1896. 8vo. *Birmingham* 1899. From the Author.

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Norway.

Bergen.

AB. Bergenske Museum.

Christiania.

AB. Kongelige Norske Frederiks Universitet.

Tromsoe.

p. Museum.

Trondhjem.

AB. Kongelige Norske Videnskabers Selskab.

Portugal.

Coimbra.

AB. Universidade.

Lisbon.

AB. Academia Real das Sciencias.

p. Secção dos Trabalhos Geologicos de Portugal.

Oporto.

p. Annaes de Sciencias Naturaes.

Russia.

Dorpat.

AB. Université.

Irkutsk.

p. Société Impériale Russe de Géographie (Section de la Sibérie Orientale).

Kazan.

AB. Imperatorsky Kazansky Universitet.

p. Société Physico-Mathématique.

Kharkoff.

p. Section Médicale de la Société des Sciences Expérimentales. Université de Kharkow.

Kieff.

p. Société des Naturalistes.

Kronstadt.

p. Compass Observatory.

Moscow.

AB. Le Musée Public.

B. Société Impériale des Naturalistes.

Odessa.

p. Société des Naturalistes de la Nouvelle-Russie.

Pulkowa.

A. Nikolai Haupt-Sternwarte.

St. Petersburg.

AB. Académie Impériale des Sciences.

B. Archives des Sciences Biologiques.

AB. Comité Géologique.

Russia—*continued.*

AB. Ministère de la Marine.

A. Observatoire Physique Central.

Scotland.

Aberdeen.

AB. University.

Edinburgh.

p. Geological Society.

p. Royal College of Physicians (Research Laboratory).

p. Royal Medical Society.

A. Royal Observatory.

p. Royal Physical Society.

p. Royal Scottish Society of Arts.

AB. Royal Society.

Glasgow.

AB. Mitchell Free Library.

p. Natural History Society.

p. Philosophical Society.

Servia.

Belgrade.

p. Académie Royale de Serbie.

Spain.

Cadiz.

A. Instituto y Observatorio de Marina de San Fernando.

Madrid.

p. Comisión del Mapa Geológico de España.

AB. Real Academia de Ciencias.

Sweden.

Gottenburg.

AB. Kongl. Vetenskaps och Vitterhets Samhälle.

Lund.

AB. Universitet.

Stockholm.

A. Acta Mathematica.

AB. Kongliga Svenska Vetenskaps-Akademie.

AB. Sveriges Geologiska Undersökning.

Upsala.

AB. Universitet.

Switzerland.

Basel.

p. Naturforschende Gesellschaft.

Bern.

AB. Allg. Schweizerische Gesellschaft.

p. Naturforschende Gesellschaft.

Switzerland—*continued.*

Geneva.

AB. Société de Physique et d'Histoire Naturelle.

AB. Institut National Genevois.

Lausanne.

p. Société Vaudoise des Sciences Naturelles.

Neuchâtel.

p. Société des Sciences Naturelles.

Zürich.

AB. Das Schweizerische Polytechnikum.

p. Naturforschende Gesellschaft.

p. Sternwarte.

Tasmania.

Hobart.

p. Royal Society of Tasmania.

United States.

Albany.

AB. New York State Library.

Annapolis.

AB. Naval Academy.

Austin.

p. Texas Academy of Sciences.

Baltimore.

AB. Johns Hopkins University.

Berkeley.

p. University of California.

Boston.

AB. American Academy of Sciences.

B. Boston Society of Natural History.

A. Technological Institute.

Brooklyn.

AB. Brooklyn Library.

Cambridge.

AB. Harvard University.

B. Museum of Comparative Zoology.

Chapel Hill (N.C).

p. Elisha Mitchell Scientific Society.

Charleston.

p. Elliott Society of Science and Art of South Carolina.

Chicago.

AB. Academy of Sciences.

p. Astrophysical Journal.

p. Field Columbian Museum.

p. Journal of Comparative Neurology.

Davenport (Iowa).

p. Academy of Natural Sciences.

United States—*continued.*

Ithaca (N.Y.).
- A. Journal of Physical Chemistry.
- *p.* Physical Review (Cornell University).

Lawrence.
- *p.* Kansas University.

Madison.
- *p.* Wisconsin Academy of Sciences.

Mount Hamilton (California).
- A. Lick Observatory.

New Haven (Conn.).
- AB. American Journal of Science.
- AB. Connecticut Academy of Arts and Sciences.

New York.
- *p* American Geographical Society.
- *p.* American Museum of Natural History.
- A. American Mathematical Society.
- AB. Columbia College Library.
- *p.* New York Academy of Sciences.
- *p.* New York Medical Journal.

Philadelphia.
- AB. Academy of Natural Sciences.
- AB. American Philosophical Society.
- *p.* Franklin Institute.
- *p.* Wagner Free Institute of Science.

Rochester (N.Y.).
- *p.* Academy of Science.

St. Louis.
- *p.* Academy of Science.

Salem (Mass.).
- *p.* American Association for the Advancement of Science.
- AB. Essex Institute.

San Francisco.
- AB. California Academy of Sciences.

Washington.
- AB. Patent Office.
- AB. Smithsonian Institution.
- AB. United States Coast Survey.
- B. United States Commission of Fish and Fisheries.
- AB. United States Geological Survey.
- AB. United States Naval Observatory.
- *p.* United States Department of Agriculture.
- A. United States Department of Agriculture (Weather Bureau).

West Point (N.Y.).
- AB. United States Military Academy.

CATALOGUE OF OBJECTS AND EXPERIMENTS EXHIBITED AT THE CONVERSAZIONE HELD IN THE SOCIETY'S APARTMENTS IN BURLINGTON HOUSE ON MAY 3, 1899.

1. *Exhibited by Mr. W. R. Pidgeon, M.A.*

A new Influence Machine.

The sectors of this machine are imbedded in an insulator, and the earthing brushes carry insulated inductors, kept charged by exploring points, and so arranged that, at the moment of being earthed, each sector stands between two similarly charged bodies; its capacity is then at a maximum, and it receives a proportionately large charge. As the sectors move away from the inductors their capacity decreases and potential rises, thereby producing an increased reaction on the opposite disc. The induction of the machine starts up almost instantly, its output is large, and it is not greatly affected by dampness or dust.

2. *Exhibited by Mr. A. A. Campbell Swinton.*

1. Experiments with the Wehnelt Electrolytic Contact Breaker.

This apparatus consists of an electrolytic cell containing dilute sulphuric acid, into which dip a large lead plate as cathode, and a small platinum wire as anode. The interruptions in the current appear to be caused by the gaseous sheath that is electrolytically formed round the anode. They occur with remarkable abruptness, and can be arranged to take place with great frequency. The apparatus will not operate upon a circuit devoid of self-induction, and the frequency varies with the amount of self-induction, the applied voltage, and the area of the anode surface. As evidenced by a rotating mirror, by varying these factors the frequency can be altered within wide limits, and may exceed 1,500 interruptions per second.

2. Collection of Vacuum Tubes used for investigating the Reflection of Cathode Rays.

3. *Exhibited by Mr. Thomas Andrews, F.R.S.*

1. Microscopic structure of Heavy Steel Guns, Projectiles, and Warship Propeller Shafts.

Illustrating the micro-crystalline structure, as seen in section at a high magnification, of 37-ton steel guns, steel projectiles, and the large steel propeller shafts used in the construction of warships and torpedo destroyers.

2. Fatigue Deterioration in Steel Rails.

Illustrating the gradual development, as seen microscopically, of fine transverse cracks on the face of steel rails subjected to heavy main line traffic.

4. *Exhibited by Professor Ewing, F.R.S., and Mr. W. Rosenhain.*

Microscopic Specimens showing effects of Strain in Metals.

The specimens show that when metals are strained beyond the elastic limit, plastic yielding takes places by numerous slips occurring on cleavage or gliding planes within each of the crystalline grains, as explained by the exhibitors in a paper communicated to the Royal Society on March 16. These slips are shown by dark lines or bands appearing on the face of a polished specimen when it is extended or compressed or otherwise strained. Under oblique illumination the slip-bands are bright.

The exhibit includes strained specimens of iron, copper, silver, gold, lead, nickel. Photographs of slip-bands are also shown.

5. *Exhibited by the Tsetze Fly Committee of the Royal Society.*

Enlarged Photographs, taken by Surgeon-Major Bruce, illustrating districts in South Africa affected by the Tsetze Fly Disease.

6. *Exhibited by Mr. A. Mallock.*

Thin Films used as Mirrors.

The films are formed by allowing a solution of pyroxyline in amyl acetate to spread on the surface of water. The films being removed when the solvent has evaporated, are then stretched over rings, whose edges have been ground to a true plane, and silvered.

The three telescopes, A, B, C, are placed over mirrors formed respectively by a silvered film, worked glass, and ordinary glass, so that objects in the room may be viewed by reflection from them, and the definition given by each estimated.

7. *Exhibited by Professor J. Norman Collie, F.R.S.*

Photographs of the Canadian Rocky Mountains.

These photographs were taken during a journey of exploration to the sources of the Athabasca and Saskatchewan rivers. The chief result of the expedition was the discovery of the largest snow fields and highest peaks at present known to exist in the Canadian Rocky Mountains.

8. *Exhibited by Mr. H. M. Taylor, F.R.S.*

Model showing the Twenty-seven Lines on a cubic surface.

The inner faces of two brass plates hinged together represent two of the forty-five triple tangent planes of the surface. The three lines on each brass plate represent three of the lines on the surface; the remaining twenty-one lines on the surface are represented by silk strings. The twenty-seven lines may be divided into three sets of nine lines, each set lying in two sets of three triple tangent planes. The different colours distinguish three such sets of nine lines. Every line meets four lines of its own set, and three lines of each of the other sets. A cubic surface passes through all the lines, no

matter at what angle the brass plates are inclined. The Arabic numerals denoting the different lines are taken from a paper in the 'Philosophical Transactions,' vol. 185 (1894), Series A.

9. *Exhibited by Mr. J. E. Barnard, F.R.M.S., and Mr. T. A. B. Carver, B.Sc.*

Photomicrographic Apparatus for High Powers, designed for the Jenner Institute of Preventive Medicine.

To secure rigidity among the several components, the apparatus is upon a stiff girder; which, in extreme cases, may be suspended by springs to isolate it from a source of vibration. The apparatus is arranged for use with transmitted light, but the illumination of opaque objects is provided for by a prism carried upon a jointed support above the stage, the arc lamp and condenser having sufficient range to allow the beam to be thrown in a line parallel to and above the line of collimation of the microscope. The slides upon which the components have motion are graduated so that the conditions under which any photograph is obtained may be recorded and reproduced.

10. *Exhibited by Dr. Patrick Manson and Surgeon-Major Ross, I.M.S.*

The development of *Filaria nocturna*, Manson, and of *Proteosoma Grassii*, Labbé (one of the parasites of malaria of birds), in the mosquito.

Microscopic specimens of mosquitoes showing the development of these parasites in the tissues.

11. *Exhibited by Mr. Joseph Goold.*

1. Novel intersection patterns in Compound-vibration Curves.

The intersections of common pendulum curves present no very definite order of figuration. Some are varied and fantastic; others are gauzy and almost uniform in structure; whilst all display a marvellous regularity of development, all correspond to various combinations of conditions.

By ruling the conditions we rule the effects. The most characteristic of this class of effects is that in which the number of lobes or divisions in the intersection pattern is identical with the number of nodal points in the kinetic outline. Beautiful illustrations of such figures will be found in this collection.

2. A differential Micrometer.

The distinguishing feature in this arrangement is a screw having 40 threads to the inch on the back part, and $41\frac{2}{3}$ on the fore part.

The fore part works in a sliding nut, the back part works in a fixed nut. Consequently *one complete turn of the screw* drives the sliding nut forward 1/40 of an inch by the action of the back thread, and draws it back $1/41\frac{2}{3}$ of an inch by the action of the fore thread. The net forward motion is therefore $\frac{1}{40} - \frac{1}{41\frac{2}{3}} = \frac{25}{1000} - \frac{24}{1000} = \frac{1}{1000}$ of an inch.

12. *Exhibited by Mr. Everard F. im Thurn, C.M.G.*

Orchids of Guiana; water-colour sketches.

Bifrenaria, Catasetum, Cheiradenia, Dichæa, Epidendrum, Ionopsis, Lanium, Lepanthes, Macradenia, Maxillaria, Notylia, Octomeria, Ornithidium, Pleurothallis, Rodriguezia, Selenipedium, Spiranthes, Stenia, Trichocentrum, Trichopilia, &c.

13. *Exhibited by Mr. H. N. Dickson*

Series of Charts showing (*a*) the Distribution of Temperature and Salinity over the surface of the North Atlantic during 1896 and 1897; (*b*) the Mean Temperature of the Surface Waters of the Sea round the British Isles, and its Relation to the Mean Temperature of the Air.

(*a*) The series of twenty-four maps showing the distribution of temperature over the surface of the North Atlantic during each month of the years 1896 and 1897, has been prepared from a large number of observations made by captains and officers of ships, the records of which are deposited in the Meteorological Office. The data for the corresponding maps of salinity have been obtained from about 5,000 samples of water collected for the exhibitor by about thirty vessels; the salinities have been determined by chlorine titration.

(*b*) The mean monthly temperatures of the surface of the sea have been calculated from observations made for the Meteorological Office at about sixty coast-guard stations and light-vessels round the British coasts during the eighteen years 1880 to 1897. A second series of maps shows the differences between these means and the mean temperature of the air.

14. *Exhibited by Professor W. N. Hartley, F.R.S., and Mr. Hugh Ramage F.C.S.*

1. Photographs of the principal lines of Gallium in Arc and Spark Spectra compared with lines in the Solar Spectrum

These photographs were taken with the 21½ feet concave grating of the Royal University of Ireland, in order to measure accurately the wave-lengths of the lines and compare them with two lines in the solar spectrum. The results led to the conclusion of the presence of the metal gallium in the sun.

2. Examples showing the application of Photography to the Minute Chemical Analysis of Minerals and Metallurgical products.

(*a*) Specimens of meteorites, and plates of spectra obtained by heating the powdered substances in the oxyhydrogen flame. By examination of these the metals and metallic oxides contained in them were ascertained.

(*b*) Raw materials used and metallurgical products obtained in iron smelting.

Plates of spectra photographed in course of the examination of these substances.

15. *Exhibited by Professor W. N. Hartley, F.R.S., and Professor J. J. Dobbie, D.Sc.*

Photographs of Absorption Spectra of Organic Compounds, showing the Method of Investigating peculiar cases of Isomerism called Tuntomerism or Desmotropy.

These photographs show how substances of the same composition and very nearly but not quite of the same chemical structure may be distinguished one from the other by studying the rays which they absorb, and so ascertaining the nature of the internal vibrations of their molecules (Hartley, 'Chem. Soc. Trans.,' vol. 47, 1885, p. 685). The relation of such substances as isatin and carbostyril to their methyl derivatives has for a long time been a vexed question, incapable of solution by the recognised chemical methods of research. The true methyl and ethyl derivatives of such compounds generally differ but slightly in their absorption spectra from the parent substances, and the nature of the difference is known.

It will be seen by inspection that methylisatin and methylcarbostyril are substances which have been wrongly named, because their spectra do not agree with those of such simply derived substances, while on the other hand methylpseudoisatin and methylpseudocarbostyril appear to be of similar chemical structure to isatin and carbostyril, and therefore are the true derivatives.

16. *Exhibited by Mr. Charles P. Butler, A.R.C.S.*

Three forms of Eclipse Spectroscope.

Several methods have been described for converting an ordinary opera-glass into an observing spectroscope for the time being, all of which involve more or less alteration of the eyepiece, owing to the length of the direct-vision prism used. In the three forms shown the dispersion piece is instantly attached or removed without changing the eyepiece.

One of the new methods is to convert an ordinary prism into a direct-vision one by Fuch's plan of cementing a plane mirror to the back surface, and then use the combination as an objective prism. In this case the prism has its maximum efficiency.

The other two plans are rendered possible by the skill of Mr. Thorp, of Manchester, in producing copies of Rowland's gratings almost as perfect as the originals and mounting them on prisms of such angle that the deviation of the first order is neutralised, giving direct-vision gratings. One of these is shown as an *ocular*, and another as an *objective* grating, the latter giving about *four* times the dispersion of the former.

17. *Exhibited by Mr. Edwin Edser, A.R.C.S.*

The Phase-change associated with the reflection of light from a Fuchsine film.

Two unsilvered glass plates, forming the end mirrors of a Michelson interferometer, are provided with films of fuchsine on their back surfaces. A horizontal strip of fuchsine is removed from one of the mirrors. Interference fringes are produced by means of rays of light reflected from the fuchsine

films; these fringes are focussed on the slit of a spectroscope. The resulting spectrum is found to be crossed by vertical dark bands. In the violet and blue, the bands formed by reflection, in the glass, from fuchsine and air respectively, are seen to be continuous. Since fuchsine is optically less dense than glass for blue light, this is in agreement with theory. Passing onward toward the red end of the spectrum, a gradual displacement occurs in the bands produced by the light reflected from the fuchsine. Red light is seen to be retarded by half a wave-length when reflected from fuchsine.

18. *Exhibited by Mr. Shelford Bidwell, F.R.S.*

Experiments demonstrating Multiple Vision.

A bright object of suitable form, for which the eye is not accommodated, appears to be not merely blurred, but multiplied. Thus the number of distinct images of an incandescent electric lamp filament, seen through a lens from a distance of a few feet may amount to about 400. If a narrow slit is interposed between the eye and the lens, a row of images is formed.

This phenomenon is attributed to the cellular structure of the transparent media of the eye, and may be imitated by means of a lens covered with a few layers of gauze. (*See* 'Roy. Soc. Proc.,' Jan. 19, 1899, page 241.)

19. *Exhibited by Mr. James Swinburne.*

Nernst Electric Lamps.

The Nernst Lamp has an electrolytic conductor, which only conducts when hot. The temperature is below the melting point, but sufficiently high to admit of a high efficiency, as the conductor is made of the most refractory materials known, namely, of rare earths. The lamp is started by a platinum wire heater, which is cut out of circuit automatically as soon as the electrolyte conducts.

20. *Exhibited by Dr. Woodward, F.R.S.*

A selection of Zoological Specimens from Christmas Island (Indian Ocean), collected by Mr. C. W. Andrews, B.Sc.

The fauna and flora of Christmas Island owe their special interest to their isolation, and to the circumstance that till quite lately the island was untouched by man. As arrangements made some time ago for the occupation of the island seemed likely to lead to the accidental introduction of numerous animals and plants, Sir John Murray organised an expedition in 1897, to make as complete collections as possible of the indigenous fauna and flora before they were affected.

Mr. Andrews remained there ten months, collecting at different seasons and investigating the geology of the island.

A very large proportion of the animals exhibited are peculiar to the island. These include all the mammals, all the land-birds, except a small rail and some birds of passage, some of the reptiles, and a large number of insects.

21. *Exhibited by Dr. Francisco P. Moreno, Director of the La Plata Museum, Argentine Republic.*

1. Portion of skin of an extinct ground-sloth, named *Neomylodon listai* by Ameghino, from a cavern in Southern Patagonia.

2. Plaster reproduction of skeleton of *Toxodon platensis*, an extinct ungulate quadruped from the Pampa Formation, Province of Buenos Aires, Argentina.

The original skeleton of *Toxodon*, of which the above is a reproduction for the British Museum, is preserved in the Museum of La Plata.

3. Reproduction of skulls as follows:—

Toxodontotherium compressum, Ameghino, Monte Hermoso Beds, Argentina; *Nesodon patagonicus*, Mercerat, sp., Santa Cruz Beds, Patagonia; *Onohippidium Munizi*, Moreno, Pampa Formation, Loberia, Buenos Aires; *Dasypus retusus*, Ameghino, Monte Hermoso Beds, Argentina.

4. Slab of Translucent Marble from La Toma, San Luis, Argentina.

22. *Exhibited by Dr. G. Herbert Fowler.*

Examples of Floating Organisms from the surface and deep-water of the Faeroe Channel.

The deep-water organisms were captured by a net made to open and close when desired; they were taken from various depths down to 500 fathoms, and at temperatures as low, in some cases, as 30° F. The experiments, undertaken in order to obtain information as to the distribution of floating organisms in deep water, were carried out on board H.M.S. *Research*.

23. *Exhibited by Professor H. L. Callendar, F.R.S.*

Recording instruments.

(1) Electric Lamp Recorder.—For showing the number of lamps in circuit, or the current on a scale of equal parts. The instrument is connected to the lighting mains, and records the number of lamps, &c., in use during the evening.

(2) Radiation Recorder.—This instrument was exhibited at the Bristol meeting of the British Association. It has since been made in a more delicate form, capable of recording the thermal radiation in ordinary daylight as well as direct sunlight.

24. *Exhibited by Sir W. Crookes, F.R.S.*

New Photographic Researches on Phosphorescent Spectra.

It has long been known that certain substances enclosed in a vacuous glass bulb phosphoresce brightly when submitted to molecular bombardment from the negative pole of an induction coil. The ruby, emerald, diamond, alumina, yttria, samaria, and a large class of earthy oxides and sulphides, emit light under these circumstances. Examined in a spectroscope the light from some of these bodies gives an almost continuous spectrum, while that from others, such as alumina, yttria, and samaria, gives spectra of more or less sharp bands and lines.

The exhibitor shows photographs of a group of lines high up in the ultra-violet region, characteristic of a new element associated with yttrium, and

separated by long fractionation. To this element the name Victorium has been given.

The atomic weight of Victorium is probably near 117. In the purest state in which it has yet been prepared Victoria is of a pale-brown colour.

25. *Exhibited by the Marine Biological Association.*

1. Methods of Feeding of Marine Animals, illustrated by living and preserved examples.

A series of selected animals from the neighbourhood of Plymouth will be shown illustrating different methods practised for securing food. One or other of the following means is usually adopted: (*a*) the production of currents by either ciliary or muscular action; (*b*) the prehension of moving prey either by special organs provided with pincers, suckers, or nematocysts, or by teeth and jaws; (*c*) browsing upon or sucking in nutritive material, either living or dead.

2. Charts illustrating the distribution of the fauna and bottom-deposits near the 30-fathom line from the Eddystone Grounds to Start Point.

26. *Exhibited by Mr. Adam Hilger.*

Michelson Echelon Grating Spectroscope.

Constructed by Adam Hilger for Lord Blythswood.

It consists of 15 plates of parallel glass superposed "en echelon," the steps being 1 mm. Resolving power = 118,000.

27. *Exhibited by Sir Norman Lockyer, K.C.B., F.R.S.*

Photographs of Stellar Spectra, &c., taken at the Solar Physics Observatory, South Kensington.

(*a*) The large photographs were obtained with the prismatic camera, having two prisms of 45° and an objective of 6 inches aperture. The smaller series was obtained with a 9-inch reflector and a prism of 10 inches, the photographic plate being placed directly in the focus and optical axis of the reflector. The whole arrangement is shown in the diagrammatic section of the apparatus.

(*b*) Photograph of a meteor taken by Mr. C. P. Butler with a 9-inch objective fed by a 16-inch cœlostat on the night of April 8, 1899. Besides showing the intermittent pulses often seen in meteor trails, the fact of the trail being quite sharp while the star trails adjoining are out of focus may indicate a method of approximately determining the height of the meteor.

28. *Exhibited by Professor Arthur Thomson, M.A.*

A model to illustrate how natural curliness of the hair is produced.

Three factors require consideration in the production of curly hair: (1) the hair shaft; (2) the hair muscle; and (3) the sebaceous gland

Straight hair is always circular on section, and is usually thicker than curly hair, which is ribbon-like and fine. In order that the muscle may act as an erector in the hair it is requisite that the shaft of the hair embedded in the skin should be sufficiently strong to resist any tendency to bend; unless this be so, the lever-like action necessary to produce its erection is destroyed. When the hair is fine and ribbon like, the shaft is not sufficiently stout to resist the strain of the muscle, and naturally assumes a curve, the degree of curvature depending on the development of the muscle, the resistance of the hair, and the size of the sebaceous gland. The curve thus produced becomes permanent, and affects the follicle in which the hair is developed, the softer cells at the root of the hair accommodate themselves to this curve, and becoming more horny as they advance towards the surface, retain the form of the follicle, the cells on the concave side of the hair being more compressed than those on the convex side. In this way the hair retains the form of the follicle after it has escaped from it.

29. *Exhibited by Mr. W. Saville-Kent, F.L.S.*

Natural-Colour Photographs of Zoological and Botanical subjects, mostly from life, taken and prepared by the exhibitor.

The photographs exhibited, chiefly in the form of lantern slide transparencies, are prepared from negatives taken through screens corresponding in tint with the three primary colours of the spectrum—red, green, and blue-violet—as first enunciated by the late Professor Clerk-Maxwell, and since adopted in the colour photography researches and inventions with which the names of Ives, Joly, Lippmann, Lumière, and others are associated.

The positives from the foregoing negatives are printed as three film or glass transparencies, each of which is tinted with the colour complementary to that of its respective negative; they are then superimposed in correct register.

This photographic method promises to be of high value for the correct colour record of biological subjects, and more especially of marine forms, whose frequently brilliant tints are notably evanescent.

30. *Exhibited by Dr. Sorby, F.R.S.*

1. Actiniæ and other marine animals killed by menthol and preserved in formalin in a fully expanded condition, and the same mounted as transparent lantern slides.

The addition of a little menthol to sea water in which the animals are living causes them to expand very fully, and in many cases to die so. When completely dead they can be transferred to 4 per cent. formalin, and kept thus distended or mounted in balsam as lantern slides.

2. Various marine animals preserved as museum specimens in strong glycerine.

The index of refraction of glycerine is so nearly that of the soft tissues of animals that it makes them more or less transparent. The colour of the surface and of the internal organs is thus well seen; and, instead of the

animals looking dull and opaque, as when kept in formalin or alcohol, they look bright and life-like, and much of the internal structure is distinctly visible.

31. *Exhibited by Professor E. A. Schäfer, F.R.S.*

1. Specimens showing that after hemisection of the spinal cord, Clarke's column undergoes atrophy on the same side below the lesion.

2. Specimens showing that the fibres of the pyramidal tract terminate at the base of the posterior horn and in Clarke's column, and not in the anterior horn.

3. Specimens showing that the fibres of the descending antero-lateral tract terminate in the anterior horn.

32. *Exhibited by Mr. W. W. Taylor.*

Paper models of the Regular and Semi-regular solids.

The Regular Solids consist of three classes: (1) the Convex Regular Solids; (2) the Star Regular Solids; (3) the Complex Regular Solids. These all have related to them an inscribed sphere that touches all the faces, a circumscribed sphere that passes through all the vertices, and an intrascribed sphere that touches all the edges.

The Semi-regular Solids (convex or star) possess two of these spheres. "The Solids of Archimedes," as the convex ones are called by Kepler, are bounded by regular polygons of two or more different kinds, and possess a circumscribed and an intrascribed sphere: so do also the corresponding semi-regular star figures. The reciprocals of these possess an inscribed and an intrascribed sphere, but are not contained by regular polygons. These are the different classes of figures of which models are shown.

33. *Exhibited by Mr. C. Carus-Wilson.*

Decomposed flints from Southbourne.

Corroded and decomposed pebbles, originally composed of two varieties of flint—stable and unstable. Percussion due to wave-action developed incipient conchoidal fractures in the unstable parts; this "mastoid" structure facilitated the penetration of the solvent which removed the colloid silica, and thus accelerated molecular disruption. These specimens illustrate the remarkable results of combined mechanical and chemical action upon flint pebbles. See 'Nature,' May 1, 1890.

34. *Exhibited by Professor H. L. Callendar, F.R.S.*

Recording Pyrometers—Platinum and Thermo-electric.

The Platinum Pyrometer, in addition to recording the temperature, regulates the furnace to within 1° at 1000° C.

35. *Exhibited by Mr. W. Duddell.*

Oscillograph for tracing Alternate-Current Wave-forms.

This Oscillograph is arranged for tracing the wave-forms of potential difference and current in investigations with alternating currents. It is essentially a galvanometer which has the extremely short periodic time of one ten-thousandth (0·0001) second, and which is perfectly dead beat, and has a sensibility, as arranged, of 300 mm. per ampere.

36. *Exhibited by Professor Hele Shaw and Mr. A. Hay.*

Lines of Force in a Magnetic Field determined by the stream lines of a thin film of viscous fluid, and also plotted from mathematical investigation.

The method of investigating stream line motion exhibited last year with water, has been developed with much improved results by employing more viscous fluids, such as glycerine. It has been applied in a new direction, and instead of a complete obstruction corresponding to a solid body immersed in a liquid, the obstruction is made to occupy only a portion of the thickness of the film. This affords a means of investigating magnetic problems in two dimensions. The case of the elliptic shell has been investigated mathematically, and a general solution of the problem obtained. Some of the results of this investigation are plotted in the form of diagrams, and are exhibited in conjunction with those obtained by means of the experimental method.

37. *Exhibited by Professor W. F. Barrett, F.R.S.E.*

New Thermo-electric Combination, giving a nearly constant electric-motive force through a wide range of changing temperature.

This thermo-electric couple consists of a new nickel-manganese-iron alloy combined with the purest commercial iron as the second metal. It is found to have the remarkable property of giving a practically constant E.M.F. (3,700 microvolts) through a temperature rising from 450° to 950° C.—*i.e.*, a black to a bright red heat—the opposite junctions being kept at the temperature of the air. The alloy here used is found to have the enormous specific electrical resistance of 97 microhms per c.c. at 15° C., and also a low variation of resistance with change of temperature.

ANNIVERSARY MEETING.

1899.

On Wednesday, November 30, being St. Andrew's Day, the Anniversary Meeting of the Society was held in their apartments in Burlington House.

The LORD LISTER, F.R.C.S., D.C.L., LL.D., President, in the Chair.

The Report of the Auditors was presented as follows:—

"During the past year, the total Ordinary Receipts on General Purposes Account, including the Treasury Grant of £1,000 for Publications, amount to £7,174 14*s.* 4*d.*

"The total Ordinary Expenditure for the same period on General Purposes, including grants for Publications, amounts to £6,843 4*s.* 5*d.*, showing an excess of Ordinary Income over Expenditure of £331 9*s.* 11*d.*

"By the transfer to the General Purposes Account of the balance of the Government Publication Grant, which was unapplied at the close of the last financial year, amounting to £883 15*s.*, the total Income for the year has been increased to £8,058 9*s.* 4*d.*, and by the writing off of two debit balances amounting to £706 5*s.* 11*d.*, the total Expenditure has been increased to £7,549 10*s.* 4*d.*, leaving an excess of Income over Expenditure of £508 19*s.*"

"The Assets of the Society on the General Purposes Account amount to £2,110 18*s.*, against which there are liabilities amounting to £1,613 8*s.* 9*d.*, leaving a balance to the credit of the Account of £497 9*s.* 3*d.*, in place of the debit balance of £11 9*s.* 9*d.* with which the year began."

"The total Receipts on account of Trust Funds, including balances from the preceding year, amount to £5,142 2*s.* 5*d.*, and the total Expenditure to £2,805 2*s.* 6*d.*, leaving a balance on account of Trust Funds of £2,336 19*s.* 11*d.*"

The thanks of the Society were voted to the Treasurer and Auditors.

The Secretary read the following Lists:—

FELLOWS DECEASED SINCE THE LAST ANNIVERSARY (NOV. 30, 1898).

On the Home List.

Anderson, Sir William, K.C.B.
Armstrong, Sir Alexander, K.C.B.
Barrow, John, F.S.A.
Blake, Henry Wollaston, M.A.
Colenso, Rev. William, F.L.S.
Dawson, Sir J. William, C.M.G.
Flower, Sir William Henry, K.C.B.
Frankland, Sir Edward, K.C.B.
Galton, Sir Douglas, K.C.B.
Herschell, Right Hon. Farrer, Lord, G.C.B.
Hicks, Henry, M.D.
Hincks, Rev. Thomas, B.A.
Jenner, Sir William, G.C.B.
Limerick, Charles Graves, Lord Bishop of, D.D.
M'Coy, Sir Frederick, K.C.M.G.
Nicholson, Prof. Henry Alleyne, M.D.
Price, Rev. Bartholomew, D.D.
Roberts, Sir William, M.D.
Rutherford, Prof. William, M.D.
Younghusband, Charles Wright, Lieut.-General, C.B.

On the Foreign List.

Bunsen, Robert Wilhelm.
Lie, Sophus.
Wiedemann, Gustav.

FELLOWS ELECTED SINCE THE LAST ANNIVERSARY.

Barrett, Prof. William F.
Booth, Charles, D.Sc.
Bruce, David, Major, R.A.M.C.
Curzon of Kedleston, George Nathaniel, Lord.
Fenton, Henry John Horstman, M.A.
Gamble, James Sykes, M.A.
Haddon, Prof. Alfred Cort, M.A.
Head, Henry, M.D.
Hele-Shaw, Prof. Henry Selby, M.I.C.E.
Lefevre, Right Hon. George John Shaw.
Morgan, Prof. Conwy Lloyd, F.G.S.
Reid, Clement, F.G.S.
Starling, Ernest Henry, M.D.
Tanner, Prof. Henry W. Lloyd, M.A.
Threlfall, Richard, M.A.
Tutton, Alfred E., B.Sc.
Windle, Prof. Bertram C. Allen, M.D.

On the Foreign List.

Boltzmann, Ludwig.
Dohrn, Anton.
Fischer, Emil.
Neumayer, Georg.
Treub, Melchior.

The following Report of the Council, which had been previously distributed to the Fellows, having been taken as read, was, on the motion of the President, received:—

REPORT OF THE COUNCIL.

Association of Academies.

With reference to the proposal for an International Association of Scientific Academies, mentioned in the Council's last Report, letters have been received from the Académie des Sciences, the Lincei at Rome, and the Imperial Academy of Sciences at St. Petersburg, expressing their approval of the suggestion and their readiness to join such an organisation. A preliminary Conference was held at Wiesbaden on the 9th October, to which the two Secretaries, with Prof. Armstrong and Prof. Schuster, were appointed as Delegates from the Royal Society (the Senior Secretary was, however, unable to attend). The Conference exhibited the most perfect accord in the desire to further the practical establishment of an Association for the purpose in view, and proposed a draft scheme for the organisation of the Association on the following lines:—

(1.) The Association shall consist of a General Assembly and a Council.

(2.) The General Assembly shall consist of Delegates appointed by the constituent Academies, each Academy having the right to appoint as many Delegates as it may think necessary. On matters of organisation, each Academy shall have but one vote. No Academy shall be bound to take part in enterprises approved by the Association.

(3.) The Assembly shall meet once every three years, but under specified conditions the time of such meeting may be altered.

(4.) The Assembly shall be divided into two sections, for Natural Science, and for Literature and Philosophy respectively. These sections shall have the right of separate meeting. Decisions arrived at by them shall be reported to the General Assembly for information, and, in case the decisions affect both sections, for confirmation.

(5.) In the interval between the meetings of the General Assembly, the affairs of the Association shall be managed by a Council, to which each Academy shall send one or two representatives according as it belongs to one or both sections, In either case each Academy will have but one vote. The Council will have a President and a Vice-President, who must belong to different sections.

International Catalogue of Scientific Literature.

The Second International Conference, held in the Society's rooms in October, 1898, appointed a Provisional International Committee, which was to consider reports on various questions discussed at the Conference, to be obtained by the Delegates to the Conference from local committees in their several countries.

The Committee met in the Society's rooms on August 1–5, those present being Prof. Armstrong, Sir M. Foster, Prof. Klein, M. Köppen and Profs. Poincaré, Rücker, Schwalbe and Weiss.

At the close of a series of very arduous sittings, during which questions of great difficulty and delicacy were discussed, a Report was agreed to; and in accordance with the decision of the second Conference, this has been issued by the Royal Society to the various Governments concerned, and will in due course be considered by the Council of the Society.

It should be mentioned that it was agreed to recommend: "That an International Conference, to arrive at a final decision on all matters concerning the Catalogue, be held at Eastertide, 1900."

National Physical Laboratory.

The questions of detail concerning the establishment of this Institution, mentioned in the Council's last Report, having been settled with H.M. Treasury, a scheme of organisation prepared by a Committee of the Council has been approved by the Lords Commissioners of the Treasury. Under this scheme the Kew Observatory Committee, as at present constituted, will cease to exist, and will be incorporated with the National Physical Laboratory, but six members of the Committee have been appointed to serve for a definite period on the Executive.

The ultimate control of the Laboratory will be placed in the hands of the President and Council of the Royal Society, and the income and all other property will be vested in the Royal Society. The Governing Body will consist of a General Board and an Executive Committee, the former composed of the Officers of the Royal Society, the Permanent Secretary of the Board of Trade, twenty-four nominees of the Council, and twelve members nominated by the Councils of the six leading technical Societies, viz.: The Institution of Civil Engineers; the Institution of Mechanical Engineers; the Institution of Electrical Engineers; the Iron and Steel Institute; the Institution of Naval Architects, and the Society of Chemical Industry.

The Council, on the recommendation of the Executive Committee, have appointed Mr. R. T. Glazebrook, F.R.S., to the Directorship of the Laboratory, and he will assume the duties of that post on the 1st January, next year. In the meantime, a number of Sub-Committees have been appointed to advise the Executive with regard to important questions as to the nature of the work to be undertaken in the Laboratory. Upon their Reports must depend largely the decision which will be taken by the Executive with regard to the buildings for the Laboratory and their site, subjects which are engaging the earnest attention of the Committee.

Protection of Royal Observatories.

The protection of Royal Observatories from the effects of magnetic influence, referred to in the Council's last Report, having received the attention of the Government, delegates were appointed at the invitation of the Treasury to represent the Council at a con-

ference of the officers of that Department. After some discussion, a model clause has received the sanction of the Chairmen of the Committees of the Houses of Lords and Commons respectively, and has been introduced into the Bills which were passed during the last Session of Parliament, for electric railways or tramways in the neighbourhood of London.

Under this clause, any Government Department which desires protection against the electrical or magnetic disturbances produced by electric railways or tramways will be at liberty to appeal to the Board of Trade, which will have power to decide whether the return conductor shall be insulated, or what other precautions shall be adopted.

Scientific Advice to the Government of India.

Early in the year, a letter was received from the India Office relating to scientific inquiry in India, and stating that, when the question had arisen of devising a scheme of investigation, the responsibility of suggestions had usually fallen on officials who were not competent to give advice. The Government of India suggested that they should have the advantage of the advice of leading men of science in England, who would exercise a general control over researches instituted by the Government. Lord George Hamilton having inquired whether the Royal Society would be willing to meet the wishes of the Indian Government by assisting in this capacity, the Council decided to appoint a Standing Committee to give such advice as it can on matters connected with scientific inquiry in India. Since the researches on which such a Committee would be consulted would probably in most instances refer to biological matters, the Committee has been chosen chiefly from among the biological Fellows.

The Committee thus constituted has a parallel in the Indian Observatories Committee established at the request of the Government some time since, and mentioned in various Reports of the Council.

Chelsea Physic Garden.

Towards the end of last year, the Council received from the Charity Commissioners a request for their views upon a scheme which, at the request of the Society of Apothecaries, the Commissioners had drawn up for the future government of the Chelsea Physic Garden, in the ownership of which the Royal Society had, by the Deed of Grant of Sir Hans Sloane, a reversionary interest. The Council appointed a Committee to consider the Charity Commissioners' scheme, and this Committee having reported to the Council in favour of the scheme, with certain amendments which the Charity Commissioners expressed their willingness to adopt, the Council have concurred in the scheme, which provides for the maintenance of the Garden, under the Charitable Trusts Acts, for the purposes of botanical study, and gives to the Royal Society, among other Institutions, a representation upon the Committee of Management.

Antarctic Expedition.

The Joint Committee of the Royal Society and Royal Geographical Society, referred to in the last Report, having indicated to the Council that there was some prospect of substantial assistance being offered from a private source to the project for an Antarctic Expedition, a memorial, signed by the Presidents of the two Societies, and by other representatives of various branches of science, was addressed to the First Lord of the Treasury, asking him to receive a deputation to explain the present prospects of the Committee and to ascertain whether H.M. Government would be able to afford some assistance to the undertaking.

A deputation waited on Mr. Balfour, and the Council are glad to announce that the Treasury is prepared to ask Parliament for grants amounting in all to £45,000 towards the expenses of the proposed Expedition, provided that not less than an equal amount is forthcoming from other sources. There is every reason to hope that this condition will be satisfied, and the Joint Committee of the two Societies is now actively engaged, with the assistance of a number of technical Sub-Committees, in making arrangements for the organisation of an Expedition to leave England in 1901.

Malaria.

As stated in the last Report, three investigators appointed by the Committee and by the Colonial Office have been sent to British Central Africa, one of them, Dr. Daniels, having previously been sent to work under Surgeon-Major Ross in India. A report of Dr. Daniels' work in India will be found in the 'Proceedings,' vol. 64, No. 411, p. 443. Reports have also been received from Drs. Stephens and Christophers, and are under the consideration of the Committee; these two gentlemen are now in England on their way to West Africa, but Dr. Daniels is continuing his observations at Blantyre and in the neighbourhood. Since the Committee was appointed our knowledge of the subject has been advanced in a remarkable manner by the researches of Surgeon-Major Ross in India and on the West Coast of Africa, by observers in Italy, and many others, but the Committee believe that the observations made in British Central Africa will also be found of value.

Tsetse Fly Disease Investigation.

The investigation of the Tsetse Fly Disease, which was interrupted by the lamented death of Prof. Kanthack, has been resumed by Drs. Rose Bradford and Plimmer, under the direction of the Committee. Some valuable observations made by these gentlemen have been published in the 'Proceedings,' vol. 65, No. 418, p. 274.

Joint Permanent Eclipse Committee.

An inquiry into the relations of the Royal Society with the Royal Astronomical Society in the constitution of the Joint Permanent Eclipse Committee was instituted by the Council in December last,

and has resulted in the acceptance by the Royal Astronomical Society of certain modifications in the arrangements existing between the two Societies. These modifications provide for Meetings of the Committee being held alternately at the Royal Society and the Royal Astronomical Society, and for more definite arrangements than existed previously with regard to the method of making grants for expeditions and of reporting upon the results thereof, and of publishing those Reports. The two Societies have under discussion the question of providing for the expense of publication of Reports of observations.

Publication Fund.

Out of the Grant of £1,000 annually placed in the Society's hands by Her Majesty's Government "to assist not merely their "own publications, but also the adequate publication of scientific "matter through other channels and in other ways," the sum of £315 has this year been paid to Societies and Agencies other than the Royal Society. Of the total sum of £4,000 received by the Society in respect of this Grant since its initiation, the sum of £1,719 15*s.* 0*d.* has been so applied.

Government Grant.

Under the Regulations for the Administration of the Government Grant, the Council has, upon the recommendation of the Government Grant Committee, made Grants amounting to £3,906, in addition to Grants out of the Reserve Fund of £250 and £300 to the Joint Permanent Eclipse Committee and the Malaria Committee respectively.

Coral-Boring Expedition.

Full details concerning this important Expedition appeared in the Council's last Report, and the Coral Reef Committee have now been authorized to prepare a monograph on the atoll of Funafuti, giving a description of the whole core from the points of view of the naturalist and the chemist, together with brief notices of all papers dealing with the general results of the Expedition, and a list, with critical remarks, of the species of animals and plants collected.

"Challenger" Expedition.

During the past year, Her Majesty's Treasury, upon the recommendation of the "Challenger" Committee of the Royal Society, has distributed several copies, either complete or partial, of the "Challenger" Reports to various Institutions and individuals.

Reports.

Yearly Reports have been received from the Kew Observatory Committee (published in the 'Proceedings'), from the Meteorological Council, and from the Joint Permanent Eclipse Committee.

Publications.

During the past year, 15 papers have been published in the Mathematical and Physical Section, and 10 in the Biological Section of the 'Philosophical Transactions.' The two sections together contain in all 984 pages of letter-press and 46 plates. Sixteen numbers of the 'Proceedings' have been issued, containing 749 pages and 12 plates.

In all, 103 papers were received between the close of the session, 1898, and the corresponding period in 1899. Of these, 43 were submitted for publication in the 'Philosophical Transactions,' and 60 for the 'Proceedings'; and 37 and 59 have been ordered for publication in the two categories respectively.

Library.

During the past year, 8 new serial publications have been added to the 458 which the Society already received at regular intervals by exchange or purchase. Besides these, 70 complete books have been added to the library by presentation or purchase. Among the additions may be specially mentioned: Annales du Musée du Congo, Brussels; Fauna Hawaiiensis, edited by D. Sharp, F.R.S.; The Danish "Ingolf" Expedition; Spée, Région *b-f* du Spectre Solaire.

The steady growth of the library is creating a great pressure on the available space, and the question of providing additional shelf accommodation is every year becoming more urgent.

Catalogue of Scientific Papers.

Progress continues to be made with the "Catalogue of Scientific Papers," and with the classified Index thereto.

As regards the supplementary portion of the Catalogue, the transcription of the copy was completed in the course of 1898, and 21 sheets have now been passed for printing.

Of the classified Index to the Catalogue, about 323,500 slips have been prepared, of which about 116,000 have been translated. During the past year about 5,500 slips have been prepared. The full translation of titles in German, French, or Italian has been discontinued.

The provisional classification of the prepared slips has been continued, and about 50,000 more slips, bringing the total up to 100,000, have been classified. About 16,000 of these, chiefly mathematical and physical titles, have been finally revised for printing. Since a considerable number of the mathematical titles do not indicate the subject-matter of the papers referred to, the progress made in the preparation of this portion of the Index is necessarily much slower than it probably will be in other subjects.

Lord Kelvin's Portrait.

Last year, the Fellows of the Society organised a movement for presenting the Society with a portrait in oils of their distinguished past President, Lord Kelvin, and subscribed a substantial fund for this purpose.

The portrait was painted by Mr. W. Q. Orchardson, R.A., and in February of the present year the President and Council, in the name of the Society, had the pleasure of accepting the portrait from the subscribers, and it will in future hang upon the Society's walls.

Sir George Stokes' Jubilee.

The celebration at Cambridge of the completion by Sir George Stokes of fifty years' tenure of his Professorship in that University, was made the occasion of an interesting ceremony, when the President and other Officers attended as Delegates from the Society, and presented Sir George Stokes with an illuminated address.

Death of Foreign Secretary.

The lamented death of Sir E. Frankland, K.C.B., whose services to the Society will be recorded elsewhere, has caused a vacancy in the office of Foreign Secretary.

After full consideration, the Council submit the name of Dr. T. E. Thorpe, F.R.S., to the Society for election to the vacant office.

"Privileged" Candidates for Fellowship.

The attention of the Council having been drawn to the regulations governing the election of Fellows under privileged conditions, a Committee was appointed early in the year to consider whether any alteration in them would be desirable. The Committee have duly reported, and, in accordance with their report, the Council have under consideration a modification of the Statutes, enabling the Council to recommend to the Society for election persons who either are Members of Her Majesty's Privy Council, or have rendered signal service to the cause of science, provided that not more than three such persons shall be elected in any one year, the persons so recommended to be selected by the Council by ballot in accordance with a procedure to be established by Standing Orders of Council. The Standing Orders which the Council propose to make correspond in the main with the procedure for the adjudication of the medals, but are still more stringent in character.

The President then addressed the Society as follows:—

During the past year death has removed twenty Fellows of the Society and three Foreign Members.

The deceased Fellows are:—

John Barrow, died December 9, 1898, aged 91.
Sir William Anderson, December 11, 1898, aged 64.
Sir William Jenner, December 11, 1898, aged 83.
Rev. Bartholomew Price, December 29, 1898, aged 80.
Henry Alleyne Nicholson, January 19, 1899, aged 55.
Rev. Thomas Hincks, January 25, 1899, aged 81.

Rev. William Colenso, February 10, 1899, aged 88.
William Rutherford, February 21, 1899, aged 60.
Right Hon. Farrer, Lord Herschell, March 1, 1899, aged 62.
Sir Douglas Galton, March 10, 1899, aged 77.
Sir William Roberts, April 16, 1899, aged 70.
Sir Frederick M'Coy, May 13, 1899, aged 76.
Henry Wollaston Blake, June 27, 1899, aged 84.
Sir William Henry Flower, July 1, 1899, aged 67.
Sir Alexander Armstrong, July 4, 1899, aged 81.
Charles Graves, Lord Bishop of Limerick, July 17, 1899, aged 87.
Sir Edward Frankland, August 9, 1899, aged 74.
Lieut.-General Charles Wright Younghusband, October 28, aged 79.
Dr. Henry Hicks, November 18, 1899, aged 62.
Sir J. William Dawson, November 19, 1899, aged 79.

The Foreign Members are :—

Sophus Lie, February 18, 1899, aged 57.
Gustav Wiedemann, March 23, 1899, aged 72.
Robert Wilhelm Bunsen, August 16, 1899, aged 88.

Obituary notices of nearly all will be found in the Year Book, but there are some to whom I may be permitted to refer briefly on the present occasion.

Sir Douglas Galton was in the earlier part of his career a promising officer of the Royal Engineers, and, as such, held for a time important positions under Government. But he was afterwards better known as a principal authority on sanitary matters, especially on the hygienic construction of buildings. He also became a zealous and capable administrator of many public institutions.

He did much to promote British science by his twenty-five years of faithful service as General Secretary of the British Association; and during the last few years of his life he earned a special debt of gratitude by the share which he took in promoting the establishment of a national physical laboratory. Professor Oliver Lodge was the first to propose the creation of such an institution; but Sir Douglas gave a new and powerful impetus to the movement when he was President of the British Association, at Ipswich. He not only supported the scheme in his Presidential Address, but read a paper on the corresponding German Institution—the Reichsanstalt, at Charlottenburg—which he had previously visited. His efforts were warmly supported by the physicists present at the Ipswich and Liverpool meetings of the Association, with the result that the National Physical Laboratory is now an established fact. Science will not easily forget the part which Sir Douglas took in bringing about this happy result.

He was elected a Fellow of the Royal Society in 1859, and was made a K.C.B. in 1887.

William Henry Flower was born at Stratford-on-Avon in 1831. He received his medical education at University College, London, and showed his predeliction for Zoology in his student days by gaining Dr. Sharpey's Gold Medal in Physiology and Dr. Grant's in Comparative Anatomy. He took the degree of M.B. at the University of London at the age of 20, and having subsequently entered the medical service of the army he served in the Crimean War, receiving the Crimea medal with four clasps. Returning with health temporarily broken by the terrible hardships of the siege of Sebastopol, he left the army, and was afterwards placed upon the surgical staff of the Middlesex Hospital, then intending to practice as a surgeon. Yet it is significant that his first published work was anatomical, 'Diagrams of the Nerves of the Human Body.' It is also noteworthy that he held at the Middlesex Hospital the office of Curator of the Museum. In 1861, at the age of 30, he succeeded Quekett as Curator of the Hunterian Museum of the College of Surgeons, becoming afterwards Hunterian Professor. On the resignation of Sir Richard Owen in 1884 he was appointed Director of the Natural History Museum, and he retained that important office till failing health compelled his resignation last year.

As a comparative anatomist Flower devoted his labours chiefly to the Mammalia. To attempt to make even the briefest reference to his very numerous contributions to the knowledge of their structure and relations would be entirely out of place on the present occasion. Suffice it to say that they were of the highest importance, and that on the Cetacea, which were a specially favourite subject of his researches, he came to be one of the highest living authorities. He was also in the front rank as a structural anthropologist.

The arrangement of museum collections was a matter which engaged Flower's earnest attention. How near museums were to his heart was shown by his making them the subject of his Presidential Address to the British Association. One well qualified to speak on the subject has said "the arrangement and exhibition of specimens carried out by Flower in both instances" (the Hunterian Museum and the Natural History Museum) "was so definite an improvement on previous methods, that he deserves to be considered as an originator and inventor in museum work. His methods have not only met with general approval, and their application with admiration, but they have been largely adopted by other curators and directors of museums, both at home and abroad." How beautifully he carried his ideas into practice, has been a matter of familiar admiration to all who have followed the development of the Natural History Department of the British Museum under his hands.

Sir William Flower was a man of noble and generous nature, ever ready to give his aid and counsel to those who sought it.

He was elected a Fellow of the Royal Society in 1864, and was afterwards awarded a Royal Medal. Besides being the recipient of many other distinctions, he was a Corresponding Member of the Académie des Sciences and a Knight of the Prussian order Pour le Mérite. He was made K.C.B. in 1892.

In Edward Frankland we have lost one of the pioneers of modern chemistry; for it is to him principally that we owe the conception of atomicity, as he preferred to call it, which is the basis of our entire system of rational or constitutional formulæ.

In dedicating his Experimental Researches to his friend and teacher Bunsen, "in gratitude for the teaching whereby he has so deeply imbued me with the necessity for thoroughness and accuracy in all scientific work," he reflected one of his own most striking characteristics; and his work, like that of his great master, was aided by a remarkable gift of experimental skill. Though chiefly active as an organic chemist, he was keenly interested in physical problems, and in the application of science to the practical affairs of life.

He began original work in 1847 in Lyon Playfair's laboratory in the Museum of Practical Geology. In association with his fellow-assistant and friend Kolbe, he then engaged in important researches into the molecular constitution of some organic salts; and these led up to his momentous discovery of zinc ethyl in 1849. The synthetic methods of preparing hydrocarbons subsequently developed by Würtz, Schorlemmer, and Fittig were the logical outcome of this early work of Frankland. The wonderful powers of zinc methyl and ethyl as synthetic agents were fully recognised by Frankland, and turned to account by him in various directions. A particularly brilliant series of examples of their use is presented by the papers which he wrote in conjunction with his friend, Mr. Duppa, on the synthesis of acids of the lactic series, published in the 'Philosophical Transactions.'

Frankland's great manipulative skill is apparent in his work on organic metallic compounds, and is also strikingly illustrated by the improvements which he introduced in the apparatus for gas analysis, by which he greatly shortened the operations, and even increased their accuracy beyond the point attained by Bunsen.

When Frankland succeeded Hofmann as Professor at the Royal College of Chemistry in 1865, he took over the work of preparing for the Registrar-General the monthly analysis of the waters supplied to the Metropolis. The methods of analysis then in use did not satisfy his refined sense of accuracy, nor did they seem to him to afford sufficient evidence on which to judge of the fitness of a water for drinking purposes, and he soon sought to improve them; and his appointment as Chemist to the Rivers Pollution Commission in 1868

led him to give increased attention to the subject. The methods he introduced for determining organic matter gave rise to much controversy at the time, but their great value is now fully recognised.

As Rivers Pollution Commissioner he worked incessantly for six years with wonderful intensity of purpose. One result of his labours is the monumental series of reports of which he was practically the author; while a less obvious effect was the establishment of the enlightened views on water supply which have long prevailed in this country. The debt of gratitude due to him from the nation for his unswerving advocacy of unpolluted water cannot be over-estimated.

He was elected Fellow of the Royal Society in 1853 at the early age of 28, and became Foreign Secretary in 1895. A Royal Medal was awarded to him in 1857, and in 1894 he received the Copley Medal. He was made a Corresponding Member of the French Academy of Sciences in 1866, and was more recently advanced to the higher grade of Foreign Associate. Many other foreign academies gave proof of their appreciation of his scientific work. The honour of K.C.B. was bestowed on him in 1897 in recognition of his services in connection with water supply.

He started for his autumn holiday in Norway with all the appearance of his usual health and vigour; and the news of his sudden death was a great shock to his many friends in this Society, who will long miss his genial presence which those who, like myself, have served with him in office, well know to have been the expression of a most kindly disposition.

In Sir William Dawson, Canada has lost a distinguished geologist, and one to whom the cause of education in the Dominion is deeply indebted.

He was born in 1820 in Pictou, Nova Scotia, whither his father had emigrated from Scotland, and he received his university education in Edinburgh. His geological labours, in which he was for a considerable time associated with Sir George Lyell, were directed mainly to the coal-fields and other early formations in his native country. As lately as in June, 1896, he made in person a communication to the Royal Society, in which he brought vividly before us the realities of life in remote geological time, exhibiting the fossil remains of Batrachians which had met their death by falling into the hollow trunks of trees that had remained standing erect during the deposition of subsequent strata of the coal measures. The value of his geological work was recognised by the Royal Society which made him a Fellow in 1862, and by the Geological Society of London, which conferred upon him the Lyell Medal.

His education work began in Halifax, Nova Scotia, where, after lecturing for a while on Natural History at Dalhousie College, he was made Superintendent of Education for the Province.

Conspicuous among his many educational services was that which he rendered to McGill University, of which he was appointed Principal in 1855. He held that office for thirty-eight years, and he may almost be said to have been, by his personal exertions and influence, the creator of that Institution as one of the most important seats of learning on the American continent.

Among many distinctions which he received from scientific bodies, besides those already referred to, may be mentioned the Degree of LL.D. from the University of Edinburgh and the Presidency of the British Association in 1886. He was made C.M.G. in 1881, and created a Knight Bachelor in 1884.

His eldest son, also one of our Fellows, is Director of the Geological Survey of Canada.

Sophus Lie, who died on the 18th of February of the present year, was one of the most distinguished contributors to the progress of pure mathematics during the last quarter of a century. His best-known researches are connected with the theory of continuous groups and the theory of transformation groups, which he may be said to have created. From 1872 onwards he devoted himself to the development of these theories, and of their application to geometry and differential equations; his results are contained in many memoirs and some separately published volumes, marked throughout by originality and independence. A Norwegian by birth, he was professor at Leipzig from 1886 to 1898, when he returned to Christiania to occupy a professorship specially created for him. His tenure of it was brief; the ardour with which he had pursued his investigations had broken his health; and he passed away at the age of 57.

Gustav Heinrich Wiedemann was born in Berlin in 1826. Though left an orphan at the age of 15, he received through the care of friends a good classical and scientific education. He early resolved to devote himself to Physics; but rightly judging that a thorough acquaintance with mathematics and chemistry is essential to the successful prosecution of that branch of science, he devoted himself with ardour to their study in the University of Berlin under various able teachers, including Mitscherlich, whose daughter he afterwards married. The subject of his thesis for the degree of Doctor in 1847 was an investigation in organic chemistry, involving the discovery of biuret. No university laboratory existed in those days in Berlin for experimental physics; but this defect was supplied in his case by Magnus, who allowed him to work in his own laboratory. At this time he formed a friendship for Helmholtz, which was interrupted only by death. He became a Privat-Docent in Physics in 1850, and in 1854 he accepted a call to the chair of Physics in the University of Bâle, and held that office for nine years. He afterwards occupied corresponding positions in Brunswick and Carlsruhe, and in 1871 entered upon the professorship of Physical

Chemistry in the University of Leipzig, where his early chemical studies stood him in good stead. Finally, in 1887, the chair of Pure Physics becoming vacant, he gladly accepted the offer of it, and was thenceforth able to devote his undivided energies to the subject of his special predilection. The duties of this office he continued to discharge practically up to the time of his death at the age of 72.

Wiedemann's achievements as an original investigator were great and various. His magnetic researches, which were very thorough and long sustained, brought to light a remarkable parallelism between the laws and effects of torsion and those of magnetism, and led him to the discovery of several phenomena which were rediscovered by other investigators. A determination of the value of the ohm when expressed in terms of the specific resistance of mercury, the final results of which were published in 1891, led Wiedemann to a number which hardly differs to an appreciable extent from what is now admitted as the most exact value, and affords a striking example of his care and accuracy in quantitative experiment. His literary achievements were perhaps even more remarkable. His 'Lehre vom Galvanismus und Electromagnetismus,' the first of four editions of which appeared in 1861, and the last about a year ago, is a monument of industry, untiring and judicious, and for accuracy and completeness it is perhaps unrivalled in any branch of physics. Yet in addition to the labours involved in keeping this great work constantly up to date, he undertook in 1877 the heavy task of editing the 'Annalen der Physik und Chemie,' and continued it to the end of his life. Together with his immense knowledge, Wiedemann had moral qualities —single-hearted devotion to truth, absolute fairness, and generous kindliness in recognising the merit of others—which specially fitted him for the kind of work he undertook.

Wiedemann was a Privy Councillor of the Kingdom of Saxony; in 1884 he was elected a Foreign Member of the Royal Society, which also conferred upon him the Copley Medal; and he received marks of distinction from various other Societies and Academies in Germany and elsewhere.

By the death, in August last, of Robert Wilhelm Bunsen, the veteran Professor of Chemistry at Heidelberg, the Society has lost one of its oldest and most distinguished Foreign Members. He was elected in 1858; in 1860 the Copley Medal was awarded to him for his chemical discoveries; and seventeen years later, Bunsen and his colleague, Kirchhoff, became the recipients of the newly founded Davy Medal, in recognition of their joint ever-memorable researches on the foundation of the branch science of Spectrum Analysis. His energies throughout a long life were entirely devoted to the extension of our knowledge of Nature; his researches covered a wide ground, and were all distinguished both by accuracy of work and originality of thought. He was,

moreover, a great teacher; students came to him from all parts of the world, and many of them have contributed largely to the advance of chemical science. In character, Bunsen was high minded and large hearted, a man beloved and honoured by all who knew him.

The general work of the Society during the past year, which has been of unusual variety and importance, has been so fully described in the Council's Report, that it would be needless repetition for me to refer to it in detail.

One of the most interesting of our scientific gatherings was the "Meeting for Discussion," in which Monsieur Haffkine brought before us his experience and views regarding Preventive Inoculation.

The first subject with which he dealt was the application of that system of treatment to cholera. He went out to India six and a-half years ago with the object of testing there a method which he had recently elaborated. Applying Pasteur's principles of the "attenuation et renforcement des virus," he had succeeded in obtaining the microbe of cholera in two very different degrees of intensity; one so virulent as to produce, when introduced in small quantity beneath the human skin, the most violent inflammatory disturbance, and even mortification, at the seat of inoculation, the other so mild as to cause extremely little reaction or inconvenience. And he had ascertained by experiments upon himself and some scientific friends, that if a little of the milder form of the organism was injected hypodermically, and followed a few days later by a similar dose of the more potent variety, introduced, it might be, at a place remote from the site of the first operation, the whole system of the human body had in the interval undergone such a change, that the second potent injection was unable to produce more effect than the original mild one.

This was a perfectly definite and a truly astounding fact; but there were many who doubted whether it would prove applicable for the prevention of cholera. To understand these doubts, it is necessary to bear in mind some very important distinctions that have been established regarding artificial immunity to infective diseases. Pathogenic microbes produce by their growth in organic media poisons or toxins, varying according to the nature of the microbe concerned, but often of astonishing potency; and it is commonly by means of these poisons that the infective diseases produce their fatal effects. The toxins, which are purely chemical products, can be separated by filtration from the microbes that produced them; and animals naturally highly susceptible to their action can be completely protected against them by the administration of successively larger and larger doses. When thus rendered proof against the poisons produced by the microbes, they are secured against the chief causes of their fatality.

But besides this antitoxic immunity, a strikingly different kind of

protection against infective diseases may be produced. If, instead of the toxins, the bodies of the microbes themselves are administered to an animal, it acquires a wonderful power of repelling the assaults of that particular kind of micro-organism, which is thus rendered incapable of obtaining a footing among the tissues of the creature. This kind of protection has been termed by Metchnikoff anti-infective immunity. The anti-toxic and anti-infective forms of immunity appear to be quite independent of each other. An animal may be brought to a very high degree of protection against the attacks of a microbe and yet remain perfectly susceptible to the poisonous action of its toxin.

Now cholera is essentially a toxic disease. It is by the poison which the cholera bacillus produces that the fatal symptoms are occasioned. Hence it might appear at first sight as if an anti-toxic treatment could alone give promise of success in dealing with it. Haffkine's injections, on the other hand, prepared with the bodies of the microbe, were essentially anti-infective, not anti-toxic.

Haffkine, however, felt confidence in his method, and resolved to give it a trial in India, where the dreadful disease is in some districts awfully prevalent; and he pursued his object in spite of well nigh insurmountable difficulties with an enthusiastic perseverance and a heroic self-devotion which should never be forgotten. How fully his efforts were crowned with success was evident from the striking statistics which he brought before us, confirmed as they were by Professor Simpson, now of King's College, who had shared his labours in India, and was present at the meeting.

Now that we know the success of these preventive inoculations for cholera, we are perhaps able to explain them. It appears to be established that the cholera bacillus invariably attacks the mucous membrane of the intestinal canal. And if it be admitted that this is always the primary site of its invasion, we can well understand that the anti-infective inoculation, by securely protecting the mucous membrane against the invasion of the microbe, may prevent it from ever developing in the body and from ever producing its deadly toxin.

These considerations enable us to understand Haffkine's position with reference to plague. The plague bacillus, like that of cholera, can be cultivated apart from the animal body in artificial media. Living plague bacilli could of course not be injected; but it is a happy circumstance that their life is not essential to their efficacy for producing anti-infective immunity. Cultures of the microbe could thus be used after being subjected to a temperature high enough to ensure their death, and prevent the possibility of communicating the disease with them.

But another important point claimed his attention. He had noticed in his cholera statistics that among the comparatively few persons who were attacked in spite of inoculation, the disease was as fatal as in the

uninoculated. Or, to speak technically, while the absolute mortality was immensely reduced by the inoculations, the case mortality was unaffected by them. This he attributed to the purely anti-infective character of his cholera inoculation; and it occurred to him that if he could combine, in the case of plague, the anti-toxic with the anti-infective element, he might not only diminish the number of attacks of the disease, but also render them less deadly when they did occur, by robbing the plague toxin of its power for mischief. With this object in view he resolved to cultivate the plague bacilli for so long a time as to allow of an accumulation of their toxin in a concentrated form in the liquid in which they grew; and having devised an ingenious and effective method of culture, he continued it for five or six weeks. He expressly disclaimed any wish to regard the theory that led him to this practice as more than a guess. But whether well founded or not, his guessing has been followed by striking success. It is difficult, when inoculations are practised on a large scale, to obtain accurate statistics as to the relative aggregate mortality among the inoculated and uninoculated; but with the case mortality it is otherwise. Many patients with plague were admitted into the plague hospitals; and it was easy to learn which of them had received inoculation and compare their cases as regards the proportion of recoveries with those which had not been so treated. The result has been to show incontestably that the case mortality in the inoculated is less by 50 per cent. than that in the uninoculated. Thus Haffkine's anticipation in that respect seems to have been fully justified.

At the same time the number of attacks appears to have been greatly reduced by inoculation. He brought before us certain comparisons that had been instituted in jails and elsewhere that had, as he said, the precision of laboratory experiments; where the inoculated and uninoculated were in all other respects under identically similar conditions, and all were under strict supervision, the observations being controlled by independent witnesses. And although the numbers here were not very large, the facts were extremely convincing. Taken altogether, the evidence brought before us tended to the conclusion that this system of preventive inoculation is, under proper management, capable of reducing the mortality in a plague stricken district by between 80 and 90 per cent.

At the close of his discourse Haffkine referred with confident hope to typhoid fever. Considering the close analogy that exists between that disease and cholera, he early predicted that the protective method which had proved successful with the one would answer with the other. Indeed he was only prevented from dealing with typhoid himself on the same lines by the persuasion of friends, who urged that he was already overtaxed by the cholera work. His suggestion has been more recently acted on by Professor Wright, of Netley, who has developed

with great zeal and ability a method of procedure which appears full of promise. As a member of the Plague Commission he had large opportunities for applying it in India; and although sufficient time has not yet elapsed for testing fully its protective efficacy, he clearly established its freedom from any immediate injurious consequences. Meanwhile some earlier trials, though on a limited scale, have proved so satisfactory, that our Army authorities have seen their way to recommending the system to our soldiers going out to South Africa, where the disease is grievously prevalent, and we may fairly anticipate that many a gallant life will thus be preserved.

How long the protection caused by these protective inoculations will last is at present somewhat uncertain. It will no doubt differ in its duration in different diseases. In the case of cholera it appears from Haffkine's results that it continues for upwards of a year. In plague, so far as can be judged hitherto, it would also seem to last for at least a twelvemonth. With typhoid there are not yet materials for forming an estimate.

I have thought it not unfitting to dwell upon this subject of preventive inoculation on the present occasion, because, while it is of supreme practical importance, it is in many directions of high scientific interest.

Copley Medal.

Lord Rayleigh, F.R.S.

The Copley Medal is conferred upon Lord Rayleigh for his splendid services to Physics.

Lord Rayleigh's investigations have increased our knowledge of almost every department of physical science, covering the experimental as well as the mathematical parts of the subject. Acoustics, optics, electricity and magnetism, the molecular theory of the constitution of bodies, the theory of elasticity, the composition of the atmosphere, are but a selection from the subjects of his investigations. In acoustics, he has added to our knowledge of resonance (the subject of his first paper in the 'Philosophical Transactions'), the behaviour of singing flames, the vibrations of jets, the general theory of the vibrations of dynamical systems, while his masterly 'Theory of Sound' has thrown light on and given unity to the whole of the subject. In optics, his researches include the theory of the scattering of light by small particles, with its application to the explanation of the blue of the sky, anomalous dispersion, the nature of white light, reflection from crystals, and the general theory of optical instruments. In electricity and magnetism, in addition to theoretical investigations of great importance on the distribution of alternating currents in conductors, he has made, in co-operation with Mrs. Sidgwick, those classical investigations

of the value of the ohm in absolute measure, the electromotive force of the Clark cell, the electrochemical equivalent of silver, and the specific resistance of mercury. His researches on the theory of elasticity are valued by all students of mathematical physics. In his researches on the density of gases he met with small discrepancies between the density of nitrogen derived from the air and that derived from chemical compounds. Investigations into the cause of this discrepancy, followed up with wonderful skill and perseverance, led to the discovery of a new element (argon) existing in large quantities in the atmosphere, and possessing qualities of a very novel and remarkable kind. Lord Rayleigh's researches, from the range of subjects they cover, their abundance, and their importance, have rarely been paralleled in the history of physical science.

Royal Medal.

Professor G. F. Fitzgerald, F.R.S.

One of the Royal Medals is conferred upon Professor G. F. Fitzgerald, for his brilliant contributions to Physics.

A foremost position has been occupied by Professor G. F. Fitzgerald during the last twenty years in the domain of Radiation and Electrical Theory. At a time when very few people had definite notions of the changed aspects which these subjects had assumed after Maxwell's theoretical advances, he was prominent as an expositor and developer of the new views. Thus his paper on "Electromagnetic Effects due to the Motion of the Earth" ('Trans. Roy. Dub. Soc., May, 1882) was, perhaps, the earliest explicit effort to bring the facts regarding the astronomical aberration of light and general optical knowledge as to the relation of the æther to moving matter, into relation to electrical theory. Enough was there established, in both the optical and the purely electrodynamic domain, to show that no fundamental discrepancy was to be anticipated in the new point of view. Again, his paper "On the Quantity of Energy transferred to the Æther by a Variable Current" (*loc. cit.*, November, 1883), forms probably the earliest investigation of the field of an electric radiator. The case explored is that of a uniform current of periodically varying intensity; but the historical significance of the investigation is not impaired by the circumstance that subsequent research has transferred the source of actual radiation to the oscillations of the ions in the molecule. Already, in the preceding year, reflecting that crucial evidence with regard to the new standpoint of Maxwell was probably to be sought only in the domain of radiation, he had pointed to the oscillatory electric discharge in a condenser as a means of obtaining actual electric radiation, if only the period of the oscillations could be suffi-

ciently reduced. Reference may also be made to the paper "On a Model illustrating the Properties of the Æther" ('Proc. Roy. Dub. Soc.,' January, 1885), which has been widely useful, owing to the very simple manner in which the model—which is on the principle of Maxwell's own idle-wheel representation—visualizes a large range of relations of the æther that had previously been amenable only to abstruse mathematical representation.

At an earlier period, Professor Fitzgerald was occupied with magneto-optic phenomena, particularly with the theoretical bearing of Dr. Kerr's then recent discovery of the peculiarity in the reflection of light from a magnetised substance. That subject is considered at length, with restrictions, however, to transparent media in the analysis, in the latter half of the memoir, "On the Electromagnetic Theory of the Reflection and Refraction of Light" ('Phil. Trans.,' 1879). But the main interest of this memoir consists, perhaps, in the dynamical formulation of the electric theory of light on the basis of the Principle of Least Action, and in the comparison of that theory with the optical work of the author's countryman, MacCullagh. He has thereby contributed to a broader appreciation of that writer's position, and has shown that his theory of light, which was reached inductively along purely optical lines, runs parallel, and is, in fact, identical with the theory of Maxwell which presented itself in the course of a far wider induction originating in the domain of electrodynamics. The remark with which this memoir concludes, as to the advantage of "emancipating our minds from the thraldom of a material æther" has not, perhaps, yet lost all its force.

Not the least of Professor Fitzgerald's services has been his success in guiding and energizing an Irish School of Natural Philosophy. His efforts, and those of his pupils, have had a prominent share in the development and illustration in this country of the phenomena of electric radiation. Thus, in 1889, he was engaged, with Mr. F. T. Trouton, in verifying the laws of polarisation, by reflection, for Hertzian radiation; in 1890, he brought forward a new means of detecting such radiation by a galvanometer inserted across the spark-gap; in 1892, he returns to the problem of practical electric vibrators by a series of suggestions as to ways in which a continuous vibration of the requisite high frequency might possibly be established. He has experimented, with Dr. Trouton, in 1896, on the scattering of Röntgen radiation in passing through paraffin; and, along with Mr. W. E. Wilson, he has conducted a research on the effect of the pressure of the surrounding atmosphere on the temperature of the electric arc, which must have important bearings on the theory of radiation from solid bodies. He has also completed the work of Maxwell and Chrystal on Ohm's law of conduction by minutely testing its validity for the case of electrolytes.

More recently his efforts have contributed to the elucidation of the modifications impressed on the lines of a radiant spectrum, by change of pressure of the atmosphere surrounding the radiator, and by a field of magnetic force.

His critical activity pervades an unbounded field, enlivened and enriched throughout by the fruits of a luxuriant imagination.

Royal Medal.

Professor William Carmichael McIntosh, F.R.S.

The other Royal Medal is given to Professor William Carmichael McIntosh for his very important labours as a zoologist.

Professor McIntosh may be regarded as one of a distinguished succession of monographers of the British Fauna who, beginning with Edward Forbes, have during the last fifty years done work highly creditable to British Zoology.

McIntosh's great monograph of the British Annelids, published by the Ray Society, is still in progress. Two folio volumes appeared more than twenty years ago, a third is now in the press, and a final volume is contemplated. As a result of this work, and of numerous papers on the subject, McIntosh is justly regarded as the European authority on this group of animals. But his work has by no means been wholly that of a systematist. He is the author of one of the large and important "Challenger" Reports (that on the Polychæta), and of several minor reports of the same and other Government expeditions. His other papers extend over a wide range of subjects, and deal with many structural points. His name, moreover, is associated with the discovery or the description of several of the more remarkable or problematical of marine animals—such as *Pelonaia*, *Phoronis*, and *Cephalodiscus*.

Some of Professor McIntosh's earlier papers were on fishes and their life history, and during the last ten or twelve years he has returned to that subject, and has added to the knowledge of our sea fisheries to a remarkable extent—both by observations anatomical and embryological (published in the 'Trans. Roy. Soc. Edinb.'), and in his book on British marine fishes, and by experiments on a large scale calculated to yield results of industrial importance.

Finally, Professor McIntosh has been a notable teacher in Scotland, and many of those he has trained now occupy zoological posts and have conducted important researches. He is himself still a very active worker, both in his own investigations and in directing the researches of others. He was the first to found a marine biological station in this country, and the establishment of the present well-known Gatty Marine Laboratory at St. Andrews is entirely the outcome of his energy and influence.

Davy Medal.

Edward Schunck, F.R.S.

The Davy Medal is bestowed upon Edward Schunck for researches of very high importance in Organic Chemistry.

Edward Schunck is the author of a remarkable series of contributions to the chemistry of vegetable colouring matters, dating from 1841 up to the present time, and it is noteworthy that his first English paper appeared in the first volume of memoirs issued by the Chemical Society of London.

His earlier work includes two investigations which are everywhere regarded as classical, the one relating to the Madder plant, the other to the Indigo plant, from which the two most important dye-stuffs known to us are derived. In these, besides establishing the fact that the colouring matters are not present as such in the plant, but as glucosides, he brought to light much other information of importance in relation both to alizarin and indigo, and to allied substances with which they are associated.

In 1871, by his discovery of anthroplavic acid in artificial alizarin, he gave an important impetus to the further study of the dye products of the manufacture of this substance, and thus contributed to a development of the industry which soon became of the utmost consequence.

Of late years he has devoted himself to the study of the green colouring matter of plants, and has contributed a series of remarkable papers to the Royal Society on the "Chemistry of Chlorophyll." These deal with one of the most difficult and at the same time most interesting chapters in the whole range of organic chemistry; they are full of observations of fundamental importance, and will serve as a sure foundation for all future researches on the subject. For the first time, Schunck has succeeded in obtaining well-defined crystal-like products bearing a close relationship to the natural substance. Nowhere is his remarkable skill as a manipulator, his extreme delicacy of touch, more apparent than in this his latest work.

On the motion of Sir Gabriel Stokes, seconded by Sir John Lubbock, a vote of thanks was accorded to the President for his address, with a request that he would allow it to be printed.

The Statutes relating to the election of Council and Officers were then read, and Dr. P. L. Sclater and Dr. R. H. Scott having been, with the consent of the Society, nominated Scrutators, the votes of the Fellows present were taken and the following were declared duly elected as Council and Officers for the ensuing year:—

President.—Lord Lister, F.R.C.S., D.C.L., LL.D.

Treasurer.—Mr. Alfred Bray Kempe, M.A.

Secretaries.—Sir Michael Foster, K.C.B., M.A., M.D., D.C.L., LL.D.
Professor Arthur William Rücker, M.A., D.Sc.

Foreign Secretary.—Thomas Edward Thorpe, ScD., LL.D.

Other Members of the Council.—Horace T. Brown, F.C.S.; The Rt. Hon. James Bryce, D.C.L.; Captain Ettrick William Creak, R.N.; Professor James Dewar, M.A.; Professor Edwin Bailey Elliott, M.A.; Hans Friedrich Gadow, Ph.D.; Professor William Dobinson Halliburton, M.D.; Professor William Abbott Herdman, D.Sc.; Sir Andrew Noble, K.C.B.; Professor Arnold William Reinold, M.A.; George Johnstone Stoney, D.Sc.; George James Symons, F.R.Met.S.; J. J. H. Teall, M.A.; Professor Joseph John Thomson, M.A.; Professor Edward Burnett Tylor, D.C.L.; Sir Samuel Wilks, Bart., M.D.

The thanks of the Society were given to the Scrutators.

INCOME AND EXPENDITURE ACCOUNT.

GENERAL PURPOSES.

November 13, 1898, *to November* 11, 1899.

INCOME.

		£	s.	d.	£	s.	d.
To **Fees**—							
	Admissions	20	0	0			
	Compositions	120	0	0			
	Annual Contributions, 237 at £3 / „ „ 88 at £4	1,063	0	0			
	Fee Reduction Fund	389	0	0			
					1,592	0	0
„ **Investments**—							
	Rents...	662	8	9			
	Dividends and Interest	2,559	4	6			
	Income Tax Recovered	105	17	9			
					3,327	11	0
„ **Publications**—							
	Sales:						
	"Philosophical Transactions"	632	11	1			
	"Proceedings"	192	17	6			
	Other Sales	5	2	2			
		830	10	9			
	Less Commission	84	17	5			
		745	13	4			
„	Government Publication Grant ...	1,000	0	0			
					1,745	13	4
Catalogue—							
	Sales	27	18	0			
	Transfer from Handley Fund ...	191	12	0			
	„ „ Dr. Ludwig Mond's Gift	290	0	0			
					509	10	0
	Total Ordinary Income ...				7,174	14	4
	Carried forward...				7,174	14	4

EXPENDITURE.

		£	s.	d.	£	s.	d.
By **Establishment Expenses**—							
	Salaries and Wages	1,830	16	3			
	Office Expenses	79	11	7			
	House Expenses	129	14	2			
	Coal and Light	178	3	9			
	Fire Insurance	55	5	0			
	Advertising	15	16	6			
	Postages and Petty Charges ...	107	8	0			
	Printing, Miscellaneous	201	4	2			
	Tea Expenses	15	6	2			
	Taxes...	14	11	11			
	Law Charges		—				
	Soirées and Receptions	236	2	2			
	Anniversary...	10	11	6			
	Miscellaneous	54	10	8			
	Electric Plant, Additions and Alterations	151	1	2			
					3,080	3	0
„ **Library**...		...	...		277	7	1
„ **Publications**—							
	Printing "Philosophical Transactions"	749	4	3			
	„ "Proceedings"	477	9	0			
	Paper...	350	7	10			
	Binding	50	12	10			
	Engraving and Lithography ...	416	18	1			
	Record and Year-Book	51	3	11			
		2,095	15	11			
	Grants for Extraneous Publications	315	0	0			
					2,410	15	11
	Carried forward...				5,768	6	0

INCOME AND EXPENDITURE ACCOUNT—*continued.*

INCOME.

	£	s.	d.
Brought forward	7,174	14	4
To Government Publication Grant—			
Transfer of Balance unapplied at 13th Nov., 1898	883	15	0
	£8,058	9	4

EXPENDITURE.

	£	s.	d.	£	s.	d.
Brought forward				5,768	6	0
By **Catalogue**—						
Catalogue of Scientific Papers ...	781	13	5			
Index...	293	5	0			
				1,074	18	5
Total Ordinary Expenditure ...				6,843	4	5
,, **Krakatoa Report**—						
Balance written off...				58	17	10
,, **Lendenfeld Monograph**—						
Balance written off...				647	8	1
,, **Balance**, being excess of Income over Expenditure for year				508	19	0
				£8,058	9	4

CASH ACCOUNT.

GENERAL PURPOSES

November 13, 1898, *to November* 11, 1899

RECEIPTS.	£	s.	d.
To Balance on Deposit Account, 13th Nov., 1898 (Dr. Ludwig Mond's Gift)	667	4	8
„ Balance in hand, Petty Cash	12	2	10
„ Receipts as per Income and Expenditure Account	7,174	14	4
„ Other Receipts, namely—			
Sale of Krakatoa Report	1	2	6
Sale of Lendenfeld Monograph	0	14	0
Interest on Bank Deposit (Dr. L. Mond's Gift)...	11	18	4
Atlas Assurance Policy matured	1,000	0	0
Tsetse Fly Account, from Government Grant ...	100	0	0
„ „ Donation Fund ...	25	0	0
Carrington Gift, Grant from Scientific Relief Fund	150	0	0
International Catalogue, Grant from Donation Fund	150	0	0
Malaria Research, Government Grant	300	0	0
„ „ Expenses Refunded by Crown Agents	100	11	2
	£9,693	7	10

PAYMENTS.	£	s.	d.
By Overdraft at Bankers on Current Account at 13th Nov., 1898	32	9	1
„ Payments as per Income and Expenditure Account	6,843	4	5
„ Other Payments, namely—			
Tsetse Fly Account	65	0	0
Malaria Research Grant	300	0	0
Carrington Gift, 3 quarters	22	10	0
International Catalogue	141	18	8
Water Research Grant, Balance re-transferred to Gunning Fund	29	11	10
Withdrawn from Deposit Account (Dr. Ludwig Mond's Gift)	290	0	0
„ Balance at Bank, 13th Nov., 1899—Deposit Account (Dr. L. Mond's Gift)	389	3	0
„ Balance at Bank, Current Account...	1,539	3	1
„ Balance on hand, Petty Cash	40	7	9
	£9,693	7	10

BALANCE SHEET.

GENERAL PURPOSES.

November 11, 1899.

Liabilities.	£ s. d.	£ s. d.
To Tsetse Fly Account, Grant unexpended per last Balance Sheet	28 3 3	
Add Receipts during year—		
Government Grant £100 0 0		
Donation Fund Grant 25 0 0		
	125 0 0	
	153 3 3	
Less Payments during year ...	65 0 0	88 3 3
„ Carrington Donation—		
Amount of Grant from Scientific Relief Fund	150 0 0	
Less Payment during year ...	22 10 0	127 10 0
„ International Catalogue—		
Amount of Grant from Donation Fund	150 0 0	
Less Payments during year ...	141 18 8	8 1 4
„ Malaria Research Grant—		
Receipts during year:		
Government Grant £300 0 0		
Expenses refunded by Crown Agents ... 100 11 2		
	00 11 2	
Less Payments during year 300 0		
Amount due to Society as per last Balance Sheet... 100 0 0		
	400 0 0	0 11 2

Assets.	£ s. d.	£ s. d.
By Cash at Bankers	1,539 3 1	
„ Do. in hand	40 7 9	
„ Do. on Deposit (Dr. Ludwig Mond)...	389 3 0	
		1,968 13 10
„ Tsetse Fly Report, to be repaid by Natal Government as per last Balance Sheet		142 4 2
„ Krakatoa Report—		
Balance of Cost as per last Balance Sheet	60 0 4	...
Less Sales during year... £1 2 6		
„ Transferred to Income and Expenditure Account ... 58 17 10		
	60 0 4	...
„ Lendenfeld Monograph—		
Balance of Cost as per last Balance Sheet	648 2 1	
Less Sales during year ... £0 14 0		
„ Transferred to Income and Expenditure Account ... 647 8 1		
	648 2 1	...

„	Water Research Grant unexpended per last Balance Sheet	29	11	10		
	Re-transferred to Gunning Fund...	29	11	10		
					...	
„	Publication Account—					
	Balance unapplied at 13th Nov., 1898	883	15	0		
	Less Transferred to Income and Expenditure Account	883	15	0		
					...	
„	Catalogue Account—					
	Dr. Ludwig Mond's Gift, balance unapplied at date of last Balance Sheet	667	4	8		
	Add Interest for year	11	18	4		
		679	3	0		
	Less Transferred to Income and Expenditure Account for Catalogue	290	0	0		
		389	3	0		
	Amount of Policy in Atlas Assurance Company, received during year ...	1,000	0	0		
					1,389	3 0
„	Income and Expenditure Account—					
	Excess of Income over Expenditure for year	508	19	0		
	Less Balance at 13th Nov., 1898	11	9	9		
					497	9 3
					£2,110	18 0

£2,110 18 0

ESTATES AND PROPERTY OF THE ROYAL SOCIETY

GENERAL PURPOSES.

Estate at Mablethorpe, Lincolnshire (55A. 2R. 2P.), rent £75 per annum.
Ground Rent of House, No. 57, Basinghall Street, rent £380 per annum.
" " of 23 houses in Wharton Road, West Kensington, rents £253 per annum.
Fee Farm Rent, near Lewes, Sussex, £19 4*s.* per annum.
Stevenson Bequest. Chancery Dividend. One-fourth annual interest on Balance of Bequest still in Court. (This year, £95 1*s.* 3*d.*)
£15,200 Mortgage Loan, 3½ per Cent., to the Duke of Norfolk.
£3,518 0*s.* 3*d.*, 2¾ per Cent. Consolidated Stock in Chancery, arising from sale of the Coleman Street Estate
£3,000 India 3½ per Cent. Stock.
£1,300 India 3 per Cent. Stock.—(Earl of Derby's Bequest).
£592 5*s.* 9*d.* Midland Railway 2½ per Cent. Perpetual Guaranteed Preference Stock.—(Stevenson Bequest).
£5,000 Madras Railway Guaranteed 5 per Cent. Stock.
£2,725 Great Northern Railway 4 per Cent. Perpetual Preference Stock.—(Stevenson Bequest).
£14,908 London and North Western Railway 4 per Cent. Consolidated Guaranteed Stock.—{ £12,150 General Purposes. / £2,758 " " Stevenson Bequests.)
£5,000 " " " " Consolidated 4 per Cent. Preference Stock.
£5,000 North Eastern Railway 4 per Cent. Preference Stock.
£2,760 " " " Consolidated 4 per Cent. Guaranteed Stock.—(Stevenson Bequest).
£3,333 London and South Western Railway 4 per Cent. Preference Stock.
£4,000 Southern Mahratta Railway 4 per Cent. Debenture Stock.
£389 3*s.* 0*d.* on Deposit Account at Bank, Dr. Ludwig Mond's Gift.—Catalogue Account.

TRUST FUNDS. CASH ACCOUNTS, 1899.

Scientific Relief Fund.

£6,000 L. & N.W.R. 4 per Cent. Consolidated Guaranteed Stock.
£7,200 Great Northern Railway 3 per Cent. Debenture Stock.
£4,340 South Eastern Railway 5 per Cent. Debenture Stock.
£800 2½ per Cent. Annuities.

Dr.

	£ s. d.	£ s. d.
To Balance, Income	1,458 4 9	
Less Temporarily Invested ...	885 17 10	572 6 11
,, Dividends		669 18 0
,, Income Tax recovered		21 18 11
		£1,264 3 10

Cr.

	£ s. d.	£ s. d.
By Grants		631 14 2
,, Balance, Income	1,518 7 6	
Less Temporarily Invested ...	885 17 10	632 9 8
		£1,264 3 10

Donation Fund.

£5,030 Great Northern Railway Perpetual 4 per cent. Guaranteed Stock.
The Trevelyan Bequest. £1,861 6*s.* 8*d.* Great Northern Railway 3 per Cent. Debenture Stock.

	£ s. d.	£ s. d.
To Balance		480 3 1
,, Dividends		248 9 8
,, Transfer from Jodrell Fund		142 5 5
,, Income Tax recovered		8 2 9
		£879 0 11
By Grants		297 0 0
,, Balance		582 0 11
		£879 0 11

Rumford Fund.

£2,367 2*s.* 6*d.* 2¾ per Cent. Consolidated Stock.

	£	*s.*	*d.*
To Balance	125	0	3
„ Dividends	62	18	4
Income Tax recovered	2	1	4
	£189	19	11

	£	*s.*	*d.*
By Gold and Silver Medal—Prof. O. Lodge	58	7	10
„ Gift " "	66	12	5
„ Balance	64	19	8
	£189	19	11

Bakerian and Copley Medal Fund.

Sir Joseph Copley's Gift. £1,666 13*s.* 4*d.* 2¾ per Cent. Consolidated Stock.
£403 9*s.* 8*d.* 2½ per Cent. Annuities.

	£	*s.*	*d.*
To Balance	98	9	8
„ Dividends, New 2½ per Cent. Stock	9	15	0
„ Dividend—Sir J. Copley's Fund	44	6	4
„ Income Tax recovered	1	15	3
	£154	6	3

	£	*s.*	*d.*
By Gold Medal—Sir W. Huggins	4	12	9
„ Gift	50	0	0
„ Bakerian Lecture—J. A. Ewing and W. Rosenhain	4	0	0
„ Balance	95	13	6
	£154	6	3

The Keck Bequest.

£960 Midland Railway 2½ per Cent. Debenture Stock (converted from £800 Midland Railway 3 per Cent. Debenture Stock).

	£	*s.*	*d.*
To Dividends	23	4	0
„ Income Tax recovered	0	15	2
	£23	19	2

	£	*s.*	*d.*
By Balance	23	19	2
	£23	19	2

Wintringham Fund.

£1,200 2¾ per Cent. Consolidated Stock.

	£	s.	d.		£	s.	d.
To Balance	32	18	11	By Payment to Foundling Hospital	32	18	11
„ Dividends	31	18	0	„ Balance	32	18	10
„ Income Tax recovered	1	0	10				
	£65	17	9		£65	17	9

Croonian Lecture Fund

One-fifth of the clear rent of an Estate at Lambeth Hill, from the College of Physicians, about £52 per annum.

	£	s.	d.		£	s.	d.
To Balance	6	7	10	By Lecture (1899)—Sir J. Burdon Sanderson, Bart. ...	50	0	0
„ Rent	50	5	4	„ Balance	8	6	1
„ Income Tax recovered	1	12	11				
	£58	6	1		£58	6	1

Davy Medal Fund.

£660 Madras Railway Guaranteed 5 per Cent. Stock.

	£	s.	d.		£	s.	d.
To Balance	51	8	10	By Gold Medal—Prof. J. Wislicenus	32	3	9
„ Dividends	32	4	5	„ Balance	52	10	5
„ Income Tax recovered	1	0	11				
	£84	14	2		£84	14	2

The Gassiot Trust.

£10,000 Italian Irrigation Bonds.

£500 2¾ per Cent. Consolidated Stock.

	£	s.	d.		£	s.	d.
To Balance	125	19	4	By Payments to Kew Committee	455	16	7
„ Dividends	454	2	8	„ Purchase of One Italian Irrigation Bond	110	18	6
„ One Bond drawn	116	0	0	„ Balance	144	6	8
„ Income Tax recovered	14	19	9				
	£711	1	9		£711	1	9

Handley Fund.

£4,798 Lancashire and Yorkshire Railway 4 per Cent. Guaranteed Stock

	£	s.	d.		£	s.	d.
To Dividends	185	10	4	By Transfer to Catalogue Account	191	12	0
„ Income Tax recovered	6	1	8				
	£191	12	0		£191	12	0

The Jodrell Fund.

£5,182 14*s.* 10*d.* 2¾ per Cent. Consolidated Stock.

	£	s.	d.		£	s.	d.
To Dividends	137	15	6	By Transfer to Donation Fund	142	5	5
„ Income Tax recovered	4	9	11				
	£142	5	5		£142	5	5

Fee Reduction Fund

£5,100 Metropolitan 3½ per Cent. Stock.

£9,333 London and North Western Railway 3 per Cent. Perpetual Debenture Stock.

	£	s.	d.		£	s.	d.
To Balance	119	4	8	By Transfer to Royal Society General Account	389	0	0
„ Dividends	443	4	2	„ Balance	187	17	0
„ Income Tax recovered	14	8	2				
	£576	17	0		£576	17	0

Darwin Medal Fund

£2,500 South Eastern Railway 4 per Cent. Debenture Stock.

	£	s.	d.		£	s.	d.
To Balance	213	12	9	By Silver Medal—Prof. Pearson	0	18	2
„ Dividends	96	13	4	„ Gift „ „	100	0	0
„ Income Tax recovered	3	3	4	„ Balance	212	11	3
	£313	9	5		£313	9	5

Joule Memorial Fund.

£1,000 London, Brighton, and South Coast Railway Consolidated Guaranteed 5 per Cent. Stock.
£47 19*s.* 2*d.* 2½ per Cent. Annuities.

	£	s.	d.		£	s.	d.
To Balance	83	11	11	By Balance	134	14	5
„ Dividends	49	10	2				
„ Income Tax recovered	1	12	4				
	£134	14	5		£134	14	5

Brady Library Fund.

£280 2¾ per Cent. Consolidated Stock.

	£	s.	d.		£	s.	d.
To Balance	47	7	7	By Purchase of Book	2	2	0
„ Dividends	7	9	0	„ Balance	52	19	4
„ Income Tax recovered	0	4	9				
	£55	1	4		£55	1	4

Gunning Fund.

£1,000 4 per Cent. Bond of His Excellency Dr. Gunning.

	£	s.	d.		£	s.	d.
To Balance	140	0	0	By Payments to Kew Committee	120	0	0
„ Interest	40	0	0	„ Balance	89	11	10
„ Balance of Water Research Fund re-transferred ...	29	11	10				
	£209	11	10		£209	11	10

Buchanan Medal Fund.

£258 9*s.* 2*d.* Metropolitan 3 per Cent. Stock.

	£	s.	d.		£	s.	d.
To Balance	11	0	10	By Balance	18	15	8
„ Dividends	7	10	0				
„ Income Tax recovered	0	4	10				
	£18	15	8		£18	15	8

Dividends on the following Stocks held by Messrs. N. M. Rothschild & Sons for the Royal Society:—

£200 Egyptian 3½ per cent. Preference Stock at 102½	=	£205	0 0
200 German 3 per cent. Stock at 93½	=	187	2 6
100 London and North Western Railway Consolidated Stock at 200	=	200	0 0
120 London, Brighton and South Coast Railway Deferred Ordinary (A) Stock at 179	=	214	16 0

	£	*s.*	*d.*
To Balance of Fund uninvested received from Messrs. Rothschild	68	5	6
	£68	5	6

	£	*s.*	*d.*
By Cost of Dies	65	0	0
„ Balance	3	5	6
	£68	5	6

BALANCE SHEET

TRUST FUNDS.

November 11, 1899.

Liabilities.	£	s.	d.
To Bakerian and Copley Medal Fund	95	13	6
„ Brady Library Fund	52	19	4
„ Buchanan Medal Fund	18	15	8
„ Croonian Lecture Fund	8	6	1
„ Darwin Medal Fund	212	11	3
„ Davy Medal Fund	52	10	5
„ Donation Fund...	582	0	11
„ Fee Reduction Fund	187	17	0
„ Gassiot Trust Fund	144	6	8
„ Gunning Fund	89	11	10
„ Joule Memorial Fund	134	14	5
„ Keck Bequest	23	19	2
„ Rumford Fund	64	19	8
„ Scientific Relief Fund...	632	9	8
„ Sylvester Medal Fund	3	5	6
„ Wintringham Fund	32	18	10
	£2,336	19	11

We, the Auditors of the Treasurer's Accounts on the part of the Council, have examined these Accounts and found them correct.

T. G. BONNEY,
M. FOSTER,
G. JOHNSTONE STONEY.

Assets.	£	s.	d.
By Cash at Bank on Account of Trust Funds:—			
General Account	1,704	10	3
Scientific Relief Account	632	9	8
	£2,336	19	11

A. B. KEMPE,
Treasurer.

We, the Auditors of the Treasurer's Accounts on the part of the Society, have examined these Accounts and found them correct.

RAPHAEL MELDOLA,
JOHN PERRY,
ROBERT H. SCOTT.

The following table shows the progress and state of the Society with respect to the number of Fellows as at November 11, 1899:—

	Patron and Royal.	Foreign.	Compounders.	£4 yearly.	£3 yearly.	Total.
Nov. 30, 1898 ..	4	47	133	90	226	500
Since Elected ..		+ 5	+ 2	+ 2	+13	+22
Since Deceased ..		— 3	— 8	— 5	— 5	—21
Nov. 11, 1899 ..	4	49	127	87	234	501

Account of Grants from the Donation Fund in 1898–99.

	£	s.	d.
Professor Judd, for expenses incident to the transport and arrangement of the bore from the Coral Reef in Funafuti	10	0	0
International Catalogue Committee, towards the expenses of the Committee	150	0	0
Dr. Durham, towards the expenses of the Tsetse Fly inquiry	25	0	0
Professor Schäfer, in aid of the expenses of his Researches upon the Central Nervous System	50	0	0
Mr. J. E. S. Moore, in aid of the expenses of an Expedition for the Geological and Zoological Exploration of the Basin of Lake Tanganyika	50	0	0
Dr. Downing, towards the expenses of the preparation of tables to facilitate the Computation of Precession adapted to the value of the Precessional Constants deduced by Professor Newcomb	12	0	0
	£297	0	0

MEMORANDUM.

ON THE NUMBER OF FELLOWS IN THE ROYAL SOCIETY IN THE 50TH YEAR AFTER THE ANNUAL NUMBER ELECTED WAS FIXED AT FIFTEEN. By GENERAL SIR R. STRACHEY, G.C.S.I., F.R.S.

In vol. 51, p. 463, of the 'Proceedings of the Society' will be found a paper by me that was designed to show what was the probable number of Fellows at which the Society would eventually arrive by the operation of the rule limiting the number elected annually to fifteen.

The actual results were given in detail for each year (1848 to 1891), with the result that the total number at the commencement of 1891 was shown to be 463, of whom 36 were Privileged Fellows, 26 had been elected before 1848, and 401 those elected after the rule for limiting the yearly number to fifteen had been in operation. The conclusion derived from these figures was that the number to be eventually reached by the election of fifteen annually would not be likely to exceed 420 or 425, and might be as little as 410.

At the end of 1897 the actual numbers were as follows :—

Privileged Fellows	29
Elected before 1848.....	7
Elected from 1848	412
Total	448

These figures quite confirm the conclusions before come to. The number of Fellows who had been elected from 1848 remaining in the Society in the years following 1891, were as follows :—

Beginning of 1891	401
„ 1892	405
„ 1893	400
„ 1894	409
„ 1895	413
„ 1896	414
„ 1897	410
„ 1898	412

It may be remarked, also, that the number of Privileged Fellows, those not elected on scientific qualifications, has steadily decreased since 1880 when there were 42 such Fellows; the number now being only 29.

The ratio of the actual number of survivors among the Fellows, compared with the numbers computed for Dr. Farr's life tables (shown in Table IV of the paper before quoted), was seen in the forty-third year to be 1·050, that is, 5 per cent. more favourable, and the subsequent years to 1898 show a slightly increased ratio—rising nearly to 1·07.

It may still be considered that for each Fellow elected annually there will eventually be 28 Fellows remaining at any given time, in addition to any Privileged Fellows who are outside of these calculations.

OBITUARY NOTICES OF FELLOWS DECEASED.

CARL GEORG FRIEDRICH RUDOLF LEUCKART was born in the ancient university town of Helmstedt, on the 7th October, 1822, and died at Leipzig in his 76th year on February 6, 1898. He was elected a Foreign Member of the Royal Society in 1877. Leuckart was the nephew of a celebrated but less distinguished zoologist, Frederick Sigismund Leuckart, who does not appear to have had any share in directing the tastes of his younger relative.

In 1842 young Leuckart became a student of medicine in Göttingen, and was profoundly influenced by the teaching and friendship of Rudolf Wagner, who was professor of Physiology and Anatomy—the combination of these two subjects in one chair being then usual. Leuckart's dissertation for the degree of Doctor of Medicine was entitled "De monstris eorumque causis et ortu."

In 1852 Leuckart, having previously started as *privat-docent* in Göttingen, was called by the University of Giessen to the Chair of Zoology. Here he laid the foundations of his life's work and reputation in a series of most valuable and light-giving experimental researches on the natural history of parasitic worms. This subject remained his favourite throughout his career, but he was active in almost every department of morphology, and published valuable memoirs on some member of almost every class of the animal kingdom.

In 1869 Leuckart left Giessen in order to succeed Poppig as Professor in Leipzig, where he was soon provided with a new institute and a new museum. Students from all parts of Germany, from Russia, Great Britain, and the United States, came to pursue researches in his laboratory, especially researches upon parasitic worms. At the fiftieth anniversary of his entry on the professorial career, he was made a Privy Councillor by the King of Saxony and Councillor of the city of Leipzig. On the same occasion his former pupils presented him with a "Festschrift," which is remarkable for the number and varied nationalities of the contributors. The volume in question contains a complete list of Leuckart's published memoirs and separate works. In 1873 he was Rector Magnificus of the university.

Leuckart was characterised by good-heartedness and ceaseless industry and enthusiasm in zoological investigation. He inspired warm regard in his pupils, whom he watched over with kindly and unflagging interest, not only whilst they were working with him but throughout their subsequent careers.

The more important only of Leuckart's long series of contributions to the literature of Comparative Anatomy and Zoology can be here referred to. Undoubtedly the most remarkable of his publications was among the earliest. It is a little book called 'Die Morphologie und Verwandtschaftsverhältnisse niederer Thiere,' printed at Brunswick in 1848. The power and originality of the author were clearly shown by this pamphlet. He boldly attacked and demolished the Cuvierian sub-kingdom of Radiata by separating and characterising the Cœlentera (or Cœlenterata as he in conjunction with Frey had termed them) as distinct from the Echinoderma. The conceptions which have since ripened into the doctrine of the archenteron and the cœlom are traceable to Leuckart's work, though important modifications in some respects have arisen with the progress of knowledge.

Leuckart originally stated, and repeated in 1869, that the cavity of the Cœlentera was "morphologically equivalent to the body-cavity (Leibes-höhle) of other animals." Haeckel in his "Kalkschwämme," vol. 1, p. 464, denied this, and declared that the cavity of Cœlentera is homologous with the digestive cavity of other animals, whilst their body-cavity has a totally independent origin. It is now generally held, as a result of the embryological researches of Kowalewsky, Balfour, and other English embryologists, that Leuckart's view was the more nearly correct, since the cavity of the Cœlentera is an "archenteron," which by constriction becomes divided in the higher animals into the permanent gut or "mententeron" and the "cœlom" or perigonadial and excretory cavity.

Soon after this publication Leuckart wrote the article "Zeugung," for his teacher Wagner's 'Handwörterbuch der Physiologie.' It is remarkable for philosophic grasp and wide range of treatment. In 1851 he produced a celebrated memoir "On the Polymorphism of the Siphonophora," a subject which about the same time engaged the attention of Huxley in this country. In 1853, under the title "Zoologische Untersuchungen," he published a series of observations on Siphonophora, Salpæ, Heteropoda, Cephalopoda, Crustacea, Insecta, and Elasmobranch fishes. His volume 'On the Structure and Physiology of the Honey-bee,' produced about the same time, is the best treatise on the subject, and has been invaluable to scientific bee-masters.

One of Leuckart's most definite and striking discoveries was his demonstration by a study of their embryology that the worm-like parasites known as Linguatulidæ (Pentastoma) found in the body-cavity of serpents and other Vertebrata are degenerate Arthropoda, probably related to the Arachnida. His memoir on the anatomy and reproduction of those remarkable Diptera, the Pupipara, is a valuable contribution to the knowledge of insect morphology. His discoveries in relation to parasitic worms are numerous and of great importance.

They are for the most part epitomised and incorporated with existing knowledge in his treatise, 'Die menschlichen Parasiten,' two volumes, of which the first edition appeared in 1863 and the last in 1876. Of this work there is an English translation.

He demonstrated the true nature and history of the remarkable nematoid worms, Attractonema and Sphærularia. He published in 1860 a separate work on *Trichina spiralis*, discovered originally by Sir James Paget when a student in the dissecting room of Bartholomew's Hospital, and named by Sir Richard Owen. Leuckart gave a complete history and anatomy of Trichina in its various phases of growth, and assisted by his work in checking the spread of trichinosis. One of his last discoveries was that of the intermediate host of the liver fluke, which he showed to be the small water-snail known as *Lymnæus periger*. In this discovery he was anticipated by a few weeks by Mr. Thomas, of Oxford, now Professor in Christchurch, New Zealand, who independently made the same discovery as the result of a long series of experiments, and published it in this country before Leuckart published his results.

Amongst other distinguished pupils of Leuckart is Elias Mecznikow —the founder of the theory of phagocytosis. Mecznikow discovered in Leuckart's laboratory the extraordinary life-history of the nematoid *Ascaris nigrovenosa* which has alternating complete sexual generations, the one parasitic in the lungs of the frog and the other living in damp earth.

Leuckart has the merit of being, if not the first, yet one of the very first to apply the method of "embedding" with a view to section cutting to small soft-bodied Invertebrata. The method itself was first devised by Samuel Stricker, of Vienna, who invented it in order to facilitate his study of the embryology of the frog. The simple form of embedding in wax or paraffin, which was used by these pioneers (about the year 1870), has long since been developed into the modern methods of impregnation with paraffin and the cutting of ribbons of sections by nicely adjusted machines.

Apart from all his other activities and constant hearty encouragement of his pupils and assistants, Leuckart for a long series of years rendered a great service to the zoological world by his admirable annual 'Bericht' or critical report on the progress of knowledge with regard to the anatomy and life-history of Invertebrata. Though the reports were often a couple of years later than the date of the memoirs recorded and epitomised, yet they were always looked for and read with great interest, on account both of the faculty which Leuckart had of bringing to light little-known and out-of-the-way publications of real value, and for the critical judgment and knowledge which he possessed and made use of so as to give significance to the observations of other workers which might otherwise have passed into oblivion. Rudolf

Leuckart was a sturdy honest worker of first-rate ability and of wide sympathy and grasp of his subject. He rendered services of the highest value to the science to which he devoted his life, and his name will ever be held in veneration by zoologists and comparative anatomists.

It is worth while, perhaps, to draw attention—as a last word—to the fact that, more than is the case with other zoologists of distinction, Leuckart directed his work very frequently towards results of practical or economic utility—as, for instance, in the case of so many of his researches on parasitic worms and of his treatise on the honey-bee.

E. R. L.

Sir Henry Barkly, born 1815, was the son of Aeneas Barkly, of Monteagle, Rosshire, a West India merchant, who, ruined by the Parliamentary legislation of 1838, left his family, on his death, in a financially embarrassed position. This led to young Barkly's going out to Demerara, for the purpose of improving his property. On this occasion he made a journey through British and Dutch Guiana, following the track of Sir Robert Schomburgk, and laying in stores of useful information on the resources of the colonies, which were the foundations of his love of science and of his future career as a public servant. On his return to England he, in 1845, entered Parliament as a Liberal Conservative for the borough of Leominster, and as a supporter of Sir R. Peel's Free Trade policy.

The sugar question was then, as now, a burning one, and Mr. Barkly at once made his mark in Parliament by his able speeches, displaying his profound knowledge of the subject. This led to his appointment by Earl Grey as Governor and Commander-in-Chief of British Guiana. His success as administrator of the affairs of that depressed colony secured his promotion, in 1853, to the Governorship of Jamaica, and successively to those of Victoria in 1856, Mauritius in 1863, and South Africa in 1871, to which was added the post of High Commissioner for settling the affairs of the eastern frontier of the latter colony.

In none of these colonies was his task a light one. In Jamaica he was confronted with grave financial problems, the successful solution of which demanded all his experience of the West Indies, his tact and his judgment. In Victoria, which was in the throes of its first trial of a responsible government, matters were approaching a dead-lock when by his skill as an administrator and the charm of his manner, he reconciled all conflicting interests, and in less than a year restored complete harmony. The riots in the Ballarat Goldfields, then at the height of their prosperity, he quelled, after a tour of inspection, by inducing the legislature to substitute an export duty on gold for the monthly licences to search. In Mauritius he found the railway question

beset with difficulties, which were no sooner adjusted than that outbreak of malarial fever, which for its virulence has become historic, commenced its decimation of the inhabitants, upwards of 30,000 of whom perished in Port Louis alone. The supply of quinine was exhausted at once and the last ounce has been reported to have fetched the perhaps fabulous, but credible, sum of £30. Steamers had to be sent to India and the Cape for medical stores by the Governor, who, himself acutely sensitive to human suffering, laboured day and night in establishing local hospitals and appliances for the relief of the sick, and in restoring confidence to the panic-stricken people. The pestilence was followed by a hurricane of exceptional violence, which wrecked the houses and plantations over a great part of the island.

In the Cape Colony Sir Henry's first duty was the establishment of responsible government, in settling which he had to overcome the deep-rooted jealousy of the colonists of the Eastern and Western Provinces, who each claimed the right to the seat of Government. This settled, the discovery of diamonds led to a complication of the conflicting interests of the Boers, the native tribes, and the Orange and Transvaal Free States, which resulted in the adoption of the policy recommended by Sir Henry, namely to place the Vaal district under British protection, and to annex Griqualand West. The rising of Langalibalele and his people was the next source of trouble, though it affected Natal more than the Cape Colony. All these complications led to Sir Henry's turning his attention to a confederation of all the South African States and Colonies, towards which he worked with characteristic energy and prudence; but, though favourable signs of progress in the right direction were not wanting, the time had not come for its realization, and, to his bitter disappointment, Mr. Froude's mission shelved the whole subject. He returned to England in 1877, when he retired upon his well-earned pension.

During the whole period of Sir Henry's service, he not only actively promoted (and in some cases originated) every scientific movement in the colonies which he administered, but himself collected and observed largely, sending living plants and herbarium specimens to Kew, and fossils to the British Museum, with both which institutions he kept up a continuous correspondence. To him is greatly due the enrichment of the Botanical Gardens at Victoria, the appointment of Sir F. Mueller as Government Botanist, and the undertaking by the Governments of four of the Australian Colonies of the 'Flora Australiensis.' Aided by Lady Barkly, he explored the fern floras of Jamaica and of Mauritius and its dependencies, and he contributed a very valuable paper to our 'Transactions' on the peculiar vegetation of Round Island; and another on its fauna, to the Royal Society of Mauritius.

Sir H. Barkly was a man of varied accomplishments, tall and

spare in person, retiring in disposition, and urbane in manner, the kindest of friends and most judicious of counsellors to young and old. The most harassing duties never disturbed his equanimity, and he was a true exponent of the motto he adopted "*per ardua surgo.*" He married, in 1840, Elizabeth Helen, daughter of Capt. J. T. Timins, of Hilfield, Herts, and secondly in 1860, Anne Maria, the only daughter of Sir T. S. Pratt, K.C.B., who survives him. He was created K.C.B. in 1853, G.C.M.G. in 1874, and was elected F.R.S. in 1884. He died in London, October, 1898, in his 84th year, and was buried in Brompton Cemetery. J. D. H.

GEORGE JAMES ALLMAN was born in Cork in the year 1812, and died on November 24, 1898, at the age of 86. His early years were spent in Belfast, and he was educated at the Academical Institution in that city. His original intention was to study for the bar, but developing an enthusiastic love for Natural History, he changed the course of his education and graduated in Arts and in Medicine at the University of Dublin in 1844.

Having already made his mark as a man of distinction in the scientific world, he was appointed to the Professorship of Botany in the University of Dublin, in succession to Dr. William Allman, and he held this post from the year of his graduation until 1856, when he was appointed Regius Professor of Natural History in the University of Edinburgh. He retained his Professorship at Edinburgh until 1870 when, in consequence of failing health, he resigned.

Two features marked his career as a teacher; his great skill in drawing animals and their organs upon the blackboard, and the encouragement he gave to his students to accompany him on his dredging expeditions on the Forth and to study the animals he obtained in their fresh living condition. One of his former pupils has informed me that Allman never made the mistake of attempting to crowd into his lectures too much information. He began with a brief recapitulation of the last lecture, and then coming to the new matter, spoke with deliberate eloquence, and using the blackboard with great skill made an impression upon his audience which it was difficult to forget.

After his resignation of the Professorship of Natural History at Edinburgh, Allman retired to Parkstone in Dorsetshire, where he devoted the remaining years of his life to original work in zoology, and to the pursuit of his favourite pastime of horticulture.

The number of papers of original research published by Allman is considerable, including many important essays on botanical subjects, and on animals belonging to nearly all the large classes. Throughout they are distinguished by a very remarkable foresight in the appreciation of really important features, and by the artistic skill and accuracy of his drawings and descriptions. The impression which Allman has

made upon biological science is of two kinds, that of the specialist in the Hydrozoa and the phylactolæmatous Polyzoa, and that of the general biological philosopher.

Allman's great work on gymnoblastic Hydrozoa, which was published by the Ray Society in 1871–2, is without doubt the most important systematic work dealing with the group of Cœlenterata that has ever been produced. The excellence of the illustrations alone would almost justify us in placing this work in the first rank of zoological treatises. The soft and delicate bodies of these zoophytes are such that no method of preservation that is known to us can give to our museums anything but distorted and shrivelled cadavera of the living organisms, nor can the most eloquent description convey to the mind an accurate idea of their form and grace. This being the case, great confusion arises in naming and describing species unless there are some drawings that are absolutely trustworthy in existence, to which reference may be made.

Allman's drawings of Hydrozoa and of the fresh-water Polyzoa have as a matter of fact become the "types" to which zoologists will refer for many years to come, and as such they are of extreme importance.

But the great monograph on the Hydrozoa was far more than an excellent illustrated statement of species, for it contained a most important and concise account of the anatomical structure of these animals based very largely upon his own researches.

The memoir on the structure of *Cordylophora lacustris*, which was published in the 'Philosophical Transactions' in 1863, may be regarded as the starting point of that work on Cœlenterates which will be particularly associated with his name. It was in this memoir that he clearly defined the two cellular layers of the Cœlenterate body-wall and gave to them the names "Ectoderm" and "Endoderm," which are now so familiar to all students of Biology. To Allman we are also indebted for many useful terms such as "Cœnosarc," "Trophosome," "Gonosome," and many others which have a more special application to Hydrozoan structure. Many of his papers and monographs are illustrated in the text by woodcuts, which show, in a diagrammatic form, his conception of the important features of structure and the homologies of the organs of one animal with those of others. Many zoologists have shown their appreciation of this method by copying into their text-books Allman's figures, and by constructing diagrams of the same general type to illustrate their own researches.

Of his writings that have a more general bearing, perhaps the most important theme was the method to be adopted for the construction and limitation of genera and species. Thirty-five years ago when Allman took up this matter, there was a great deal of very unsatisfactory work on systematic zoology in course of publication. New species and new genera were named in great numbers, many of which were based on single specimens or fragments of specimens, insufficiently described

and very imperfectly investigated. Although this kind of work still goes on, to Allman and two or three of his contemporaries the credit is due of having checked it. His studies in the group of Hydrozoa led him to the conviction that a species cannot be regarded as being satisfactorily defined until the whole of its life-history is known, and it may be observed that in his monograph he carefully states the characters of both the trophosome and gonosome stages of the species of Hydrozoa he investigated.

The general appreciation of Allman's investigations is shown by the honours he obtained. He was elected a fellow of the Royal Society in 1854, served on the Council of the Society from 1871—1873, and received its gold medal in 1873. He was President of the Linnean Society from 1874—1881, and President of the British Association for the Advancement of Science at the Sheffield meeting in 1879. He received the Brisbane gold medal of the Royal Society of Edinburgh in 1877, the Cunningham gold medal of the Royal Irish Academy in 1878, and the gold medal of the Linnean Society in 1896.

S. J. H.

Sir William Jenner, who died on December 11, 1898, was born at Chatham in 1815, and entered on his medical studies at University College, London, in the early years of the Institution, immediately after the opening of University College Hospital, obtaining his qualifications to practice in 1837. After holding an assistantship in the country, he entered on general practice near the Regent's Park, and in 1844 he took the degree of M.D. in the University of London. His attention had early been directed to the confusion then existing regarding the specific fevers, and he utilised his leisure time in their practical study at the London Fever Hospital. The results were published in 1849, as a minute differential description of a series of cases of typhus and typhoid fevers, so carefully observed, and thoroughly recorded, that his facts and close reasoning settled for ever the question of the non-identity of the two diseases.

The excellence of the work attracted attention, and the same year he was appointed Professor of Pathological Anatomy in University College, and Assistant Physician to the Hospital, becoming Physician in 1854, and soon afterwards he was placed in charge of a special department for diseases of the skin. In 1852 he became Physician to the Hospital for Sick Children, and in 1853 to the London Fever Hospital. He had thus abundant opportunities for the special study of many classes of disease, of which he made the fullest use. He combined clinical and pathological observation with ardent industry, and ever strove with brilliant success to obtain a clear insight into the relations between morbid processes and the symptoms by which they are manifested. His conclusions were carefully reasoned out and

expressed in clearest and most convincing manner, and his published writings on Rickets, Inherited Syphilis, Diseases of the Skin, and, at a later date, on Diphtheria, Emphysema, and Abdominal Tumours, are admirable examples of the application to medicine of a strict scientific method, with practical ends always in view.

In 1861, on the death of Dr. Baly, he was appointed Physician-in-Ordinary to the Queen, with the high responsibility of personal charge of Her Majesty and the Prince Consort, a post which entailed attendance on the latter during the fatal attack of typhoid fever in the following year. He continued to be the trusted adviser of the Queen until his retirement from practice in 1889. He was made a baronet in 1868, a K.C.B. after the severe illness of the Prince of Wales in 1871, and a G.C.B. on his retirement, receiving thus the highest titular honours short of a peerage, to which a professional man could aspire.

Sir William Jenner very early acquired the absolute confidence of the members of his own profession, and the profound regard of all who came in contact with him. He had laid a solid foundation in consulting practice before his Court appointment brought him conspicuously before the general public, and he quickly attained one of the largest consulting practices achieved by any physician of the century. In 1862 he was appointed Professor of Medicine in University College, a post which the exigencies of private work compelled him to relinguish in 1867. His lectures were highly prized by his students for their unique practical quality, the outcome of his vast experience and close habitual observation. But it was in his bedside teaching and in the post mortem room that these characteristics found thoir most brilliant expression. His thoroughness and precision of observation, lucid exposition, and clear logical reasoning, impressed indelibly the facts of disease and the *rationale* of its treatment on the mind of the hearer, and elicited the admiration of an occasional chance auditor from outside the profession. He resigned his connection with the Fever Hospital on receiving his Court appointment, and with the Hospital for Sick Children about the same time, but continued his work at University College Hospital until 1878. In 1881 he was elected President of the College of Physicians, the highest post in the medical profession, and was re-elected annually for six years. During his term of office he took a leading part in several important proceedings, especially in the amalgamation of the examinations of the College with those of the College of Surgeons to confer the "Conjoint Diploma." It was under his influence that the movement for a "Teaching University" first took practical shape in proposals that were not destined to survive, but which largely excited the more enduring movement. He felt strongly the injustice to London students, and practical disadvantage, entailed by their inability to obtain an M.D. degree for knowledge

and practical training equal or superior to that which secures it in the provinces and sister kingdoms, and urged strongly that a beginning should be made by the conjoined Colleges, but the opposition of the graduates of existing Universities was fatal to the proposal.

Sir William Jenner was elected a Fellow of the Royal Society in 1864, and few physicians have more distinctly justified the honour, both by the scientific character of their medical work, or by the professional eminence to which they have attained. He was a staunch friend, somewhat ready to take personal offence, but kind, warm-hearted, and just, never permitting personal feeling to interfere with his sense of what was right to the individual, or desirable for others.

W. R. G.

The Rev. BARTHOLOMEW PRICE, D.D., was born in 1818, at Coln St. Denis, Gloucestershire, of which parish his father, the Rev. William Price, was rector. He entered the University of Oxford as scholar of Pembroke College, and graduated B.A. in Michaelmas Term, 1840, with a third class *in Literis Humanioribus*, and a first class in mathematics.

In 1842 he gained the University Mathematical Scholarship, and in 1844 he was elected Fellow of his College, in which he subsequently held the offices of Tutor, Mathematical Lecturer, and Bursar.

In 1853 he succeeded the Rev. G. L. Cooke, as Sedleian Professor of Natural Philosophy, and thus became a member of the University staff, then less numerous than at present, on which the other representatives of mathematics and natural science were Buckland, Baden Powell, Daubeny, Donkin, Ogle, and Walker.

Besides those who received instruction from him in his capacities of Professor and College Lecturer, a considerable number of private pupils obtained from him the more detailed tuition required in the higher branches of mathematics, so that for many years he took a large share of the teaching in these subjects in Oxford.

In this work he aimed at a high ideal, and by his energy, by his care in training those who sought his assistance, and by his power of inspiring others with enthusiasm in the acquisition of knowledge similar to that which determined his own efforts, he did much to raise the standard of mathematical attainment in the University.

To the last he took the keenest interest in the progress of the Mathematical School, and when the pressure of other duties compelled him to take a smaller share in the actual work of teaching, he had the satisfaction of seeing it carried on to a considerable extent by his pupils, many of whom had become professors or college lecturers.

In 1855, Professor Price became a member of the Hebdomadal Council, then only in the second year of its existence, and on each occasion that his six-years'-term of office expired, he was re-elected, so

that he remained continuously until the summer of 1898 a member of the body by which all University legislation is initiated.

During these forty-three years the changes which have been introduced into all departments have been so great, that it would be impossible to form a correct idea of the condition of the University at the beginning of the period from any observations of what prevails now.

The change in the educational position may be taken as an instance of what has been accomplished in this period. Though the monopoly of classics and mathematics had been abolished two years before it commences, the two new directions of intellectual activity then opened to students had been followed by very few. At the present time, in addition to the two original roads to University honours, these distinctions can be reached through natural science, jurisprudence, modern history, theology, Oriental languages, English language and literature, and civil law, and the increase in the number of the names included in the class lists of the final examination for honours affords unmistakable evidence as to the effect produced by the extended facilities offered to students. This number was 175 in 1852, the last year in which classics and mathematics stood alone. In 1855 it fell to 144, probably from causes external to the University. In 1898 it had risen to 450, and to this should be added 42, on account of the women then admitted to the examinations.

In effecting all the changes to which reference has been made, Professor Price took a leading part, and his wise counsel, his sound judgment, and his influential support were always at the service of the workers in the cause of progress.

He was especially interested in promoting the study of natural science, and he strove earnestly, whenever it was possible, to secure the means of supplying efficient instruction in the different branches of this subject. He was one of the small but enthusiastic band of supporters of the then scarcely existent School, who saw the importance of uniting all the appliances for teaching science into a single institution, and who eventually succeeded in persuading the University to carry their plan into execution. Most of these pioneers have passed away, and comparatively few are now living who remember the fierce opposition they had to encounter before victory was secured, but the University museum stands as a memorial of their energy and devotion, and the group of laboratories now clustering round the original building opened in 1860, is evidence of the lasting success of the struggle, while it bears testimony to the efforts made during the last thirty-five years to improve the University as a place of scientific training.

All proposals for the extension of the museum were warmly supported by Professor Price, and it is not too much to say that they were

indebted for their accomplishment, in no small degree, to his judicious advocacy in the Council and in Convocation.

But Professor Price's labours as a teacher, a legislator, and a reformer constitute by no means the whole of the services he rendered to the University and to the cause of education; he took also a most active part in the administration of many of the most important departments. When, in 1868, the management of the estates and the general supervision of the finances of the University were confided to a special Board—the Curators of the Chest—he was at once placed upon this Board, and so remained during the thirty years which elapsed before his death. He was also for many years a Curator of the Bodleian Library, a Delegate of the Museum, and a member of several other delegacies. In addition he discharged the duties of Examiner in Mathematics, either for Moderations or for the Final School, during seventeen years.

Nor is this all. In 1868 Professor Price undertook the onerous duties of the Secretary to the Delegates of the Press, and his skill in matters of finance, combined with his capacity for business, became in yet another direction of the greatest service to the University. During his tenure of this office, which lasted until 1884, the operations of the "Clarendon Press" became largely extended, and the series of text-books which made the name very widely known, as well as the numerous important works in all branches of literature and science which issued from this press, have done much towards the improvement of education and the advancement of knowledge.

When he resigned the office of Secretary he was elected to be a permanent member of the Delegacy, so that his connection with the Clarendon Press continued to the end of his life, and he never ceased to render valuable assistance in the management of this Institution.

After the creation, by the last University Commissioners in 1881, of Boards of Faculties to control the studies of the University, Professor Price was chosen to be chairman of the Board of Mathematics and Natural Science. The discharge of this new duty was not always unattended by difficulties, and it is a clear indication of the tact and judgment with which he conducted the business, as well as of the high esteem in which he was held by all those engaged in scientific pursuits in Oxford, that he was unanimously re-elected to this office every year until his death.

When the Mastership of Pembroke College became vacant by the death of Dr. E. Evans, and the Fellows failed to elect his successor, the Chancellor of the University, acting as Visitor of the College, appointed, in 1892, Professor Price to be the Head of the Society of which he had been a member throughout the whole period of his university career.

Considering the incessant demands upon his time and attention,

arising from the very numerous duties which he had undertaken in the University, it could scarcely be expected that Professor Price would be able to find leisure for much original scientific work, and he only contributed two papers to the Ashmolean Society on the principles involved in mathematics, and one to the British Association on 'The influence of the Rotation of the Earth on the apparent Path of a heavy Particle.'

His reputation as a mathematician rests mainly upon his elaborate 'Treatise on Infinitesimal Calculus,' in four volumes, which in the second edition extends to 2663 octavo pages.

At the time that Professor Price was specially engaged in teaching he was impressed by the difficulty which an English student experienced in becoming acquainted with the progress which had been made, both in this country and on the Continent, in the developments and applications of the differential and integral calculus, and he set himself the heavy task of supplying a book which would assist to a great extent in removing this difficulty.

The work he contemplated and eventually produced was somewhat on the lines of Professor De Morgan's Treatise on the Differential and Integral Calculus, published under the auspices of the Society for the Diffusion of Useful Knowledge; but though this book, which had then been completed nearly ten years, and was becoming less easy to be obtained, suggested the scope of the new treatise, he endeavoured to improve upon it by introducing the more recent investigations and by arranging the matter in a manner more likely to be useful to a student.

The first volume on the Differential Calculus, with its applications to Geometry appeared in 1852, and was followed, after an interval of about two years, by the second volume on the Integral Calculus, the Calculus of Variations and Differential Equations. After, again, an interval of about two years, in 1856, the third volume was published treating of Statics and Dynamics of a Particle. The fourth volume on the Dynamics of Material Systems, did not appear until six years later, viz., in 1862.

Those who were studying mathematics, not only in Oxford but throughout the country during the decade covered by the publication of Professor Price's work, will remember with gratitude the wide field of knowledge that he opened up to them, and the stores of information that he placed at their disposal with such remarkable skill in arrangement and clearness in exposition. Even if exception might be taken to some details in the method adopted in treating the fundamental principles of mechanics, there could be no difference of opinion as to the usefulness of a work presenting such an important group of subjects from the point of view in which they were regarded by one well qualified to discuss their inherent difficulties, who had spared no pains

in acquiring a knowledge of all that was most valuable in the writings of those who had preceded him.

Regarding this treatise as the text-book used by his pupils, and as representing his oral teaching—a circumstance to which reference is made in every volume—it affords the strongest evidence as to the high standard to which Professor Price strove to raise the Oxford school of mathematics. That it relieved a want really felt at the time of its publication is evident from the fact that a second edition of the first two volumes was called for and partly supplied before the last volume issued from the press. It has now no doubt been superseded by more recent books—special treatises on subjects to which Professor Price devoted chapters or sections—but the second edition of the fourth volume, which was carefully revised and brought up to the time of publication, may still be very useful to a student; he will find in it an excellent account of the state at which the study of Rigid Dynamics had arrived in 1889.

Professor Price was elected into the Royal Society in 1852, and, besides assisting in various ways in carrying on the work of the Society as a member of committees, he served on the council for an aggregate period of eight years, during two of which he held the office of Vice-President. He was also for many years one of the representatives of the Society on the Board of Visitors of the Royal Observatory at Greenwich. He was, moreover, a Fellow of the Royal Astronomical Society, of the London Mathematical Society, and of the Physical Society of London, an Honorary Fellow of Queen's College, Oxford, and a Fellow of Winchester College.

Until the summer of 1898 Professor Price remained in the full discharge of the numerous duties which had accumulated upon him, but advancing years and signs of failing health induced him then to seek partial relief from work and anxiety by resigning his professorship and some of his other offices. There seemed at that time to be good reason to hope that rest would restore him to health, and that still for some years the University, which he had conspicuously served so long and so well, might continue to profit by his experience and his advice; but his strength rapidly gave way, and he died in Pembroke College on the 29th of December, 1898, in the 81st year of his age.

R. B. C.

Henry Alleyne Nicholson was born at Penrith in Cumberland on the 11th of September, 1844. His father, Dr. John Nicholson, was a Biblical and Oriental scholar of distinction. Nicholson was sent to Appleby Grammar School, and subsequently to the University of Göttingen, where it was his intention to study philology, though he soon abandoned this in favour of the Natural Sciences, and worked under the eminent zoologist, Keferstein. From Göttingen he passed

to the University of Edinburgh, where he studied medicine from 1862 to 1867, graduating as Bachelor of Medicine and Master of Surgery in the latter year. He had already (in 1866) become a Bachelor of Science, and in the following year obtained his Doctor's degree in science. Shortly after this he took the degree of Doctor of Medicine at Edinburgh and that of Doctor of Philosophy at Göttingen.

In the year 1866 he was elected Baxter Scholar in the Natural Sciences at Edinburgh University, and in the following year sent in a thesis for graduation as Bachelor of Medicine. This was his well-known 'Essay on the Geology of Cumberland and Westmorland,' for which he was awarded a University Gold Medal; the essay was soon afterwards published, and dedicated to "his friend and teacher" Robert Harkness, then Professor of Geology in Queen's College, Cork.

In 1869, when he proceeded to the degree of Doctor of Medicine, Nicholson was awarded the Ettles Medical Scholarship, which is given annually to the most distinguished medical graduate of the year. In the same year he was appointed to a Lectureship in Natural History in the Extra-Academical School of Medicine, which is attached to the University of Edinburgh. In 1871 he visited Canada, and was offered the Professorship of Natural History in the University of Toronto, a post which he accepted and retained for three years. He was then elected, almost simultaneously, to the Professorship of Comparative Anatomy and Zoology in the Royal College of Science, Dublin, and to that of Biology in the Durham College of Science; he accepted the latter appointment, but very shortly after this (in 1875), he received from the Marquess of Ailsa the offer of the Chair of Natural History in the University of St. Andrews. This offer, which was unsolicited, for Nicholson was not a candidate either directly or indirectly, was accepted. In 1877 he was for the first time appointed Swiney Lecturer by the Trustees of the British Museum, and the four courses of lectures which he delivered, were greatly appreciated by his audiences. In the following year, when Sir Wyville Thomson, who occupied the Chair of Natural History in the University of Edinburgh, was incapacitated by illness, Nicholson acted as his deputy, and conducted the work through the two succeeding sessions. In 1882 he was appointed to the Professorship of Natural History in the University of Aberdeen, and occupied the chair to the day of his death on January 19th of the present year. Nicholson was elected Fellow of the Royal Society in 1897. He was also a Fellow of the Geological, Linnæan, and many other learned Societies. In 1888 he was awarded the Lyell Medal of the Geological Society.*

Though Professor Nicholson's published writings give ample proofs of his acumen and industry, no account of his life would be complete

* Many of the facts which are recorded above are taken from a notice which appeared in 'The Daily Free Press' (Aberdeen) for January 20.

which did not refer to the influence of his personality and to his powers of exposition. He possessed all the qualifications of a successful teacher. The success of his Swiney Lectures has already been mentioned, and he was equally successful in the lecture rooms and laboratories of the various Universities with which he was from time to time connected. Those who attended his lectures were impressed by his dignified manner, ease of delivery, and clearness of style, as well as by the excellence of the subject matter of his discourses. It is written of him that "He never had to keep order: discipline was the atmosphere of his lecture room." His lectures were illustrated by beautiful diagrams, which were his own work. The difficulties which he overcame will be appreciated when it is remembered that in these days of specialisation, when many large Universities require two or three teachers of one subject, each of whom devotes himself to the elucidation of one special branch of that subject, Nicholson undertook to teach Geology in addition to Zoology. Circumstances so moulded his life that it was his duty to teach Zoology, but it was the history of past times and of the now extinct beings which then dwelt on the earth which exercised the greatest fascination over him. It was his duty to teach Zoology, but he also taught Geology with so much success at Aberdeen, that, in a very few years after commencing his geological course, his class contained about eighty students. In connection with his geological course he was wont to take his students to some centre, such as Appleby, where he could give practical instruction out of doors. These excursions were evidently appreciated very highly, as well they might be, for Nicholson was perhaps at his best when wandering among his native fells, hammer in hand, but of this more anon.

The simplicity and clearness which marked his lectures are also characteristic of his educational works. He wrote several of these, treating of Geology as well as Zoology. Those which are best known are his 'Manual of Zoology,' which has reached the seventh edition, 'The Ancient Life-History of the Earth,' in which fossils are treated to a large extent in chronological order, and the 'Manual of Palæontology,' of which the third edition, written in collaboration with Mr. R. Lydekker, has appeared in a greatly enlarged form in two volumes.

The original writings of the late Professor treated of a great variety of subjects, zoological, palæontological, and geological. Concerning existing organisms he wrote little though he reported upon the deep water fauna of Lake Ontario, and his report was published by the Legislature of Ontario; it is however by his geological writings and especially by those which treat of palæontology, that he has made his mark as an original investigator.

He wrote about 200 papers and memoirs, dealing with a great variety of subjects, both stratigraphical and palæontological; the most important were devoted to the study of some of the comparatively lowly

organisms which once inhabited the earth, especially the Hydrozoa and Actinozoa. One of his earliest publications was a contribution to the study of the graptolites, 'A Monograph of the British Graptolitidæ' (1872), which was never completed: this work and the separate memoirs which Nicholson wrote, dealing with this group, will cause him to be ever associated with Barrande, Hall, and Lapworth as a pioneer in the study of a group of fossils of great importance. He not only contributed largely to our knowledge of the morphology and classification of the graptolites, but utilised them with great success as aids to stratigraphical research, and it is of interest to learn that in his later years he returned with enthusiasm to the study of these, his early favourites. From among Nicholson's many other writings, we may select for special mention his work on 'The Structure and Affinities of the Tabulate Corals of the Palæozoic Period' (1879), and the 'Monograph of the British Stromatoporoids,' published by the Palæontographical Society, which was commenced in 1885 and completed in 1892.

Professor Nicholson's stratigraphical work was chiefly done in our English Lakeland and the adjoining regions; in this work he utilised his palæontological knowledge with much success, and accordingly his papers on the district have far more than a local value. He no doubt made occasional mistakes—who has not?—but they are alluded to here for a particular reason. Far from being annoyed when others detected his errors, Nicholson was really grateful to those who corrected him.

It was during the prosecution of his researches among the rocks of Lakeland that the writer of this notice first met Nicholson, and since that first meeting, he has spent many happy weeks with him, wandering over the fells of that fascinating region. It was at these times that Nicholson's character was so perfectly revealed. Always eager for work, he let slip no opportunity of enlarging his knowledge of the district. Of his work we can make some estimate by what he has left behind him, but no one can calculate the inestimable benefits which his friends and pupils reaped by contact with this loveable man. His hearty laugh was an indication of his joyous nature; he was joyous, not through absence of care, but because his honest and upright mind was so far removed from evil. But he could be angry, though anger was rare with him. Slow to believe that any among his acquaintances should be capable of meanness, if he was finally convinced that a mean action had been committed his anger was undisguised.

He has gone, leaving behind him a monument of work, but leaving also a wealth of tender feelings in the hearts of his friends. Science, like other branches of knowledge, counts among its devotees men of very different character. As examples to whom we would wish the attention of mankind to be directed, are those earnest students of nature in whom the love of knowledge and of humanity are combined

with that true humility which is quickened by communion with Nature. The highest tribute that we can pay to him for whom we mourn, is to say that he was enrolled among the members of this goodly company.

J. E. M.

The Rev. THOMAS HINCKS was born at Exeter, July 15, 1818, the son of the Rev. W. Hincks, Professor of Natural Philosophy at Manchester New College, York, afterwards Professor of Natural History in Queen's College, Cork, and in the University of Toronto, where he died in 1871. Thomas Hincks was nephew to the Rev. Edward Hincks, the well-known Egyptologist. He was educated at Belfast, and in the Manchester New College, from which he entered the Unitarian ministry. He was minister at Cork (1839), Dublin (1842), Warrington (1844), Exeter (1846), Sheffield (1852), and Leeds (1855). He married Elizabeth, daughter of Mr. John Allan, of Warrington, who, with two daughters, survives him. While minister at Cork, in 1840, he graduated B.A. in the London University. He was elected a Fellow of the Royal Society in 1872.

In Leeds Hincks succeeded, after a long interval, to the post once held by Dr. Priestley, and rendered memorable in the history of science by experiments preliminary to the discovery of oxygen. In his profession Hincks was active and highly respected. The old meeting house, in which Priestley taught, had been replaced by a modern chapel, to which Hincks had the satisfaction of adding schools and a congregational hall. He was prominent in educational and philanthropic work in Leeds until his breakdown in 1868. A year's leave of absence was tried in vain. In March, 1869, he was compelled to lay down his ministry, and though he lived for thirty years longer in activity and usefulness, he was unable to address any but the smallest gatherings, and these only at long intervals. "The tragedy of his life," says his widow, "was the loss of voice and the consequent enforced withdrawal from all public work." Mr. Hincks died at Clifton, where he had spent most of the years of his retirement, on January 25, 1899.

Mrs. Hincks gives the following particulars concerning her husband's work in natural history:—"I think my husband's love of natural history was hereditary. His father was a botanist, whose enthusiasm seemed to inspire all his children with a love of the study of nature. What caused Mr. Hincks to take up zoophytes as his special study I do not know. It might be that in youth he was closely associated with his life-long friend, Professor Allman. He was a persistent dredger during his holidays by the sea. Familiar as he was with very much of the British coast, his chief work was done on that of Devonshire, both north and south, and in the beautiful estuary of Salcombe. Mr. Hincks was a most successful and laborious gardener. Indeed, no

natural object, from the simplest wild flower to the passing cloud, failed to delight him."

His two books, the 'History of British Hydroid Zoophytes' (1868) and the 'History of British Marine Polyzoa' (1880), are well known to all students of marine zoology. They incorporate the best systematic knowledge of the age with respect to these large and difficult groups. Hincks was most careful and lucid in description, skilful in drawing, well read, diligent, and candid. Though description and systematic arrangement were his strong points, he was keen to appreciate the work of others in minute anatomy, embryology, and allied studies which he did not himself regularly pursue. During the preparation of his larger works he published many papers on special forms of Hydrozoa and Polyzoa, chiefly in the 'Annals and Magazine of Natural History.' Collected sets of these opuscula (1894) are to be found in public libraries. An index, with additions, was published in 1895. His collections are chiefly preserved in the British Museum of Natural History.

Mr. Hincks was a generous and disinterested friend. He had nothing of the selfishness of the baser sort of collectors, but would put a fellow student on the track of some natural history prize which he had just discovered. In every relation of life he was estimable. His amiable disposition, his lively conversation, his faithful services in his chosen profession as well as in that branch of natural history which, though at first a mere bye-pursuit, became in the end a serious part of his life-work, will never be forgotten by those who enjoyed his friend ship.

L. C. M.

Gustav Heinrich Wiedemann was born in Berlin in October, 1826. Before he was two years old, his father died, and he was scarcely fifteen when he lost his mother also. He was thus from an early age thrown much upon his own resources, but the care of friends secured for him a careful classical and scientific education. His inclination to the special study of physics, seems to have been largely due to the influence of Seebeck, who, for several years, was one of his teachers at the Cologne Gymnasium. From Cologne he proceeded, in 1844, to the University of Berlin, where he entered upon a serious course of study of mathematics, under Dirichlet and Joachimstal, and attended the chemical lectures of Heinrich Rose, and worked practically at chemistry in the private laboratory of Sonnenschein. Later he attended the lectures of Dove, Magnus, Mitscherlich and others. When he entered the University, he had already decided to devote his life to the cultivation of physics, but he considered a sound knowledge of mathematics and chemistry to be an essential preliminary qualification. He took his Doctor's degree in 1847, choosing as the sub-

ject of his thesis an investigation in organic chemistry, involving the discovery of biuret, a product of the decomposition of urea. It is significant of the changes that have occurred during the last fifty years, that when Wiedemann was a student at Berlin, there were no University lectures on mathematical physics, and no University laboratory for experimental physics. The liberality and zeal of Magnus, however, went far to supply the latter defect; he admitted students whom he thought sufficiently promising to work in his private laboratory, and encouraged them to attend the "Physical Colloquies," or evening meetings for the discussion of questions of physical interest, which he established in his own house. Wiedemann shared in these privileges, and thus became acquainted with Helmholtz, his intimate friendship with whom was interrupted only by death; he was also one of the band of strenuous young physicists, who about this time founded the Physical Society of Berlin. In 1850 he obtained the *licentia docendi* from the University of Berlin, and gave lectures as a *Privatdocent* on special branches of physics simultaneously with Beetz and Clausius.

In 1854 Wiedemann accepted a call to the Professorship of Physics in the University of Basel, where he remained till 1863, when he removed to Brunswick as Professor of Physics in the Polytechnicum. Three years later he was called to the Carlsruhe Polytechnicum to succeed Eisenlohr, and in 1871 he entered upon the Professorship of Physical Chemistry in the University of Leipzig. For sixteen years he had been teaching pure physics, but his early chemical studies, which a well-marked chemical side to several of his latter experimental researches had helped to keep alive, enabled him to discharge the duties of this new office without too great difficulty; but when, in 1887, on the retirement of his colleague Hankel, he was offered the Professorship of Physics, he was glad to be able once more to concentrate his activity upon a single branch of science. The duties of this last office he continued to discharge practically up to the time of his death, which occurred on the 21st March of last year.

One of Wiedemann's earliest experimental investigations related to the comparative thermal conductivities of the metals; his results long remained the most trustworthy that existed on the subject, and even now they have scarcely been superseded. Other researches dealt with electrical endosmose, the electrical resistance of electrolytes, the relation between the magnetic properties of compound bodies and their chemical composition, the influence of mechanical strain on the magnetic properties of the magnetic metals, and many other subjects. His magnetic researches, which were very thorough and long-sustained, brought to light a remarkable parallelism between the laws and effects of torsion and those of magnetisation, and led him to the discovery of several phenomena which were rediscovered later by other investigators.

A determination of the value of the ohm when expressed in terms of the specific resistance of mercury, the final results of which were published in 1891, led Wiedemann to a number which hardly differs to an appreciable extent from what is now admitted as the most exact value and affords a striking example of his care and accuracy in quantitative experiment.

But great as were Wiedemann's achievements as an original investigator, they were surpassed in importance by his literary labours. The editing of the 'Annalen der Physik und Chemie,' which he undertook in 1877 and continued to the end of his life, would be considered sufficiently laborious by most men who are already actively discharging the duties of an important University Professorship; but in his case it was a comparatively small addition to the work he was already engaged in. The 'Lehre vom Galvanismus und Elektromagnetismus,' or, as it afterwards became, 'Die Lehre von der Elektricität,' forms the most obvious and visible result of Wiedemann's work. The first edition appeared in 1861, and its revision and extension in three subsequent editions, the last of which was completed little more than a year ago, was a practically continuous occupation for the rest of the author's life. It is a monument of industry, untiring and judicious, and for accuracy and completeness it has no rival in any other branch of physics. In addition to his immense knowledge Wiedemann had moral qualities—single-hearted devotion to truth, absolute fairness, and generous kindliness in recognizing the merit of others, which specially fitted him for literary work of the kind he undertook.

Wiedemann was a Privy Councillor of the Kingdom of Saxony. He was elected a Foreign Member of the Royal Society in 1884, and was a Member or Honorary Member of numerous other Societies and Academies in Germany and other countries.

He married, in 1851, Clara Mitscherlich, eldest daughter of the chemist, who survives him, and he leaves a daughter and two sons, one of whom is the well-known Professor of Physics at Erlangen.

G. C. F.

Professor Sir Frederick McCoy.—The announcement of the death of this distinguished naturalist, geologist, and palæontologist, which took place at Melbourne, May 16, 1899, appeared in the morning papers in London, May 18.

Sir Frederick McCoy held the post of Professor of Natural Science in the University of Melbourne, Australia, for upwards of forty years, and had attained his 76th year at the time of his decease.

His mental activity was unimpaired; his last communication: "On a new Australian *Pterygotus*," having appeared in the 'Geological Magazine' for May, 1899, p. 193. His name in Australia will always be connected with the splendid Museum of Natural History and

Geology in Melbourne, of which he was the founder and life-long presiding genius.

Frederick McCoy was the son of Dr. Simon McCoy, M.D., of Dublin, and was born in that city in the year 1823. He was educated originally for the medical profession, and attended lectures, hospital practice, &c., in Dublin, and also in Cambridge; but while yet too young to be admitted to the profession, he devoted himself assiduously to the study of all branches of natural science, classifying the collections of the Geological and Royal Societies of Dublin, with the object of applying recent zoology to palæontology as the basis of stratigraphical geology. About this time he accepted the offer of Sir Richard Griffith to make the palæontological investigations required for the geological map of Ireland for the Boundary Survey, publishing the results in a large quarto volume in 1844, with numerous plates, including figures of several hundred new species of fossils, entitled, 'Synopsis of the Carboniferous Limestone Fossils of Ireland,' and a smaller work in 1846, 'Synopsis of the Silurian Fossils of Ireland.' He was then invited by Colonel Sir Henry James, R.E., and Sir Henry de la Beche to join the Imperial Survey of Ireland, just then commenced, and, after completing the maps of the districts surveyed by him in the field, he was appointed by Sir Robert Peel's Government as one of the first Professors of the Queen's University in Ireland, the Chair of Geology and Mineralogy in the Northern College being assigned to him, where he lectured in the Queen's College, Belfast, and examined students in Dublin. About this time he undertook, in conjunction with the late Professor Sedgwick, of Cambridge, the large work on British Palæozoic Rocks and Fossils, based on the materials in the Woodwardian Museum at Cambridge, and to make the critical examination of the great series of fossils of the older formations brought together by Sedgwick. The results of these labours were deemed worthy of the compliment of publication by the Syndics of the University Press of Cambridge in a large quarto volume, with numerous plates of new species of fossils from the Carboniferous, Devonian, Silurian, and Cambrian formations, which was issued in 1852, as the second volume of a proposed joint work (but the first volume, which was to have comprised the Rocks, by Professor Sedgwick, was never published), entitled, 'British Palæozoic Rocks and Fossils,' by Professors Sedgwick and McCoy.

Professor McCoy was shortly afterwards appointed by Sir J. Herschel and the Astronomer Royal, Sir G. B. Airy, as the first Professor of Natural Science in the new University of Melbourne, where, having taken part in the formation of the university, he lectured on chemistry, mineralogy, botany, comparative anatomy, zoology, geology, and palæontology for upwards of thirty years. He also established the National Museum of Natural History and Geology in Melbourne, of which he was Director to the last, which has risen to a distin-

guished position, not only by the extent of its collections but also by the perfection of their classification. Professor McCoy was Chairman of the first Royal Commission for International and Intercolonial Exhibitions for the Colony of Victoria. He was appointed Government Palæontologist at an early stage of the Geological Survey, determining the ages of the various tracts published on the maps. For over thirty years he prepared and continued to publish in decades, at short intervals, two works for the Government of Victoria: one entitled, 'Prodromus of the Zoology of Victoria,' with coloured figures from the life; and another, 'Prodromus of Palæontology of Victoria.' He was a Justice of the Peace for Victoria. He was elected a Fellow of the Royal Society of London in 1880, and was created one of the first Doctors of Science, *honoris causâ*, by the University of Cambridge. The Royal University of Ireland also conferred on him their highest degree in science and arts. He was created a Knight or Chevalier of the Royal Order of the Crown of Italy by King Victor Emmanuel, and has been offered similar distinctions by other foreign Sovereigns in recognition of his scientific work. In 1886 he received the decoration of C.M.G. from Her Majesty, and was created Knight Commander of that order in 1891. He has also received the Emperor of Austria's great gold medal of Arts and Sciences, the Murchison Medal from the Geological Society of London, and other similar distinctions. He was an honorary member of the Royal Society of New South Wales from 1875, and an honorary active member of the Imperial Society of Naturalists of Moscow, and honorary Fellow and member of many other British and foreign scientific bodies.

H. W.

ROBERT WILHELM BUNSEN was born on March 31, 1811, at Göttingen, where his father was chief librarian to the University, and Professor of Classical Philology; he died at his residence in Heidelberg, on August 16th last. From his earliest years up to the last, Bunsen breathed the free atmosphere of German University life, and throughout upheld the simple dignity and the entire devotion to science which are the distinctive marks of the highest ranks of the German Professoriate.

Not merely as an investigator of power and insight, but also as a teacher and master, the name of Bunsen will go down to posterity as that of one of the truly great men of the century.

The incidents of Bunsen's life are soon told. From the year 1833 onwards, when at the age of 22 he became Privat Docent in the University of his birth-place until the year 1889, when he retired from the Professorship of Chemistry, at Heidelberg, his energies, impaired by no great sorrow and by no serious drawback,

were solely devoted to the service of science. For upwards of half a century he laboured continuously as an investigator and as a teacher, and in his declining years he might well look back with a satisfaction of which few can boast, on the work which he had accomplished.

To him came in due course honours of all kinds; from monarchs and governments, and from scientific academies, all the world over. A far greater satisfaction than the receipt of all these was however his, in the warm affection and respectful regard felt for him by all those who were fortunate enough to come under his influence. All knew at once that he was a man to be trusted and honoured, whilst the simplicity of his character, his true modesty, and his unaffected kindness of heart were patent even to a casual visitor. Only, however, to the few who were admitted to his more intimate friendship were the depths of his character revealed; and for these it may be enough to say that he was the "chevalier sans peur et sans reproche," and that the recollections of his companionship, both scientific and social, will remain as some of the pleasantest and most fruitful of their lives.

The investigations of the great Heidelberg chemist opened out new branches of science in many directions; some of these were epoch making, whilst the application of others to the needs and the welfare of the human race has done much for the benefit and comfort of mankind. It was characteristic of the man that in this latter direction Bunsen himself did nothing. His was the duty of extending the boundaries of knowledge without reference to its application. Two sets of men, he used to say, were needed, investigators and those who applied scientific discoveries to useful ends. To him belonged the higher work, and he often spoke with undisguised amusement and astonishment of persons who, in the name of science, devoted all their energies to mere money making.

In 1836 Bunsen was appointed to the Chair of Chemistry in the Polytechnic School, at Cassel; two years later he became Professor in the University of Marburg. There he remained until 1851, when for a short time he went to Breslau, and in 1852 he was called to fill Gmelin's chair at Heidelberg, a quiet and beautiful spot where he spent the rest of his life, refusing pressing invitations to remove to what many consider the greater attractions of a metropolis.

Although he had accomplished much during his residence in Cassel and in Marburg: the carbon-zinc battery, the investigation of the cacodyl compounds, which paved the way for all subsequent work on the organo-metallic series, and though there he had laid the foundation for his gasometric methods, in his work on the gases of the blast furnace carried out in conjunction with Lord Playfair, and for his chemico-geological researches in Iceland, yet it was in the years following the building of the new Heidelberg laboratory in 1855, that Bunsen's greatest work was done. During the early years of that

period the experimental results of his own labours and of those of the pupils who flocked from all parts to work under him, have never been surpassed if ever equalled in quality as well as in quantity by those issuing from any other chemical laboratory. And here it may be noticed that it is given to but few teachers to reckon as he could amongst the pupils of those years so many men whose names have since become well known. To mention only some, Germany and Switzerland sent Landolt, Lothar Meyer, Pebal, Baeyer, Carius, Pauli, Hermann, Quincke, and Lieben; from Russia came Beilstein and Schiskoff; from England—Atkinson, Matthiessen, Roscoe, and Russell; whilst America, France, Portugal, Sweden, and other countries were also well represented.

Of the more important work done during those years must first be mentioned his gasometric researches. These included, amongst other matters, exact and original methods for the measurement of gaseous volumes, for the investigation of gaseous diffusion and gaseous absorption, and these he fully described in the only book he ever published. For he was not a compiler, nor was he fond of manuals, and often remarked, laughingly, that what was written down in treatises was usually wrong. Then came the invention of the Bunsen burner, about which an interesting tale could be told. Coal gas had been introduced into Heidelberg just before the new laboratory was built, and Bunsen determined to make a gas lamp for laboratory use in which a mixture of gas and air should burn without smoke or explosion in a simple tube. His clear conception of the laws which apply to the inflammation of such a mixture showed him that it was possible, although no one had hitherto succeeded in doing it, so to arrange the dimensions that a steady, non-luminous, but highly heated flame could be obtained without danger of the mixed gases becoming explosive within the tube. This result, apparently simple enough, was however only reached after a long series of delicate experiments. And now this burner is not only a necessity in every laboratory, but in every household, and in every manufactory where a clean flame is wanted. Next in importance come a series of investigations on various branches of analytical work, all characterised by original methods and delicate manipulative skill. Of these his iodometric method now in general use, and his elaborate and classical methods of silicate and mineral water analysis, are perhaps the most prominent.

Amongst the work done in conjunction with his pupils, the best known are the long series of researches on photochemical measurements with Roscoe, and that on the electrolytic preparation of the metals of the alkali-earths with Matthiessen.

In the early sixties, his crowning investigation on spectrum analysis made its appearance, including the work done, together with his colleague Kirchhoff, which gave rise to the discovery of cæsium and

rubidium. Up to 1875 he continued to work at this favourite subject, on which he published many memoirs, especially remarkable being that on the absorption spectra of the compounds of the metals of the rare earths. Amongst these is to be found the first observation of the high luminosity caused by the ignition in the colourless flame of certain of these earths, a fact which has since become of immense commercial value in incandescent gas-burners.

His research on cæsium and rubidium and their salts is, perhaps, the one in which his marvellous power of exact experimentation is seen to the greatest advantage. From 44,000 kilos. of the Dürkheim water he obtained only 16 grammes of the mixed chlorides. After he had separated these by a long and elaborate series of processes, only about 5 grammes of the chemically pure cæsium salt remained. With this comparatively minute quantity, Bunsen succeeded not only in preparing and analysing all the more important compounds of the metal, but in ascertaining by accurate goniometrical measurements their crystalline forms. So that we thus became acquainted with the properties and relationships of the compounds of this rare new metal as we had long been with those of potassium and sodium. But his labours at this time were not confined to one branch of the science. His researches covered a wide field, and were of the most diverse character, always, however, distinguished by the same seeking after exactitude both as regards experimental results and as regards their literary expression. So that his published memoirs all serve, both in matter and manner, as classical examples which will long remain fertile sources of both pleasure and profit to generations of scientific students.

As a lecturer, Bunsen shone not by attempts at declamation or oratorical effect, but by the originality of his views, the aptness of his experimental illustrations, and the clearness of his exposition. It was, however, as a laboratory teacher that he chiefly excelled. It is in the laboratory that experimental science is really learnt, and there it was that his marvellous ingenuity in the construction of new apparatus out of the simplest materials, and his wonderful manipulative dexterity was best seen. There, inspired by his continual presence, the student learnt to participate in his devotion and zeal, and took to heart a lesson that in order to found or to carry out a successful school of experimental science the teacher must work alongside of the pupil. Up to 1889 he continued indefatigably to instruct a host of the younger chemists whose work did not fall short of that done by their elder *confrères*. Nor was his own scientific energy abated, as shown in the numerous researches published in these later years. Amongst them may be noted those on the metals of the platinum group; his work on flame reactions; the important one on the ice-calorimeter; and, lastly, the one on the vapour-calorimeter.

After he retired from active work he continued to reside in Heidel-

berg, taking an interest almost up to the last in the scientific progress of the day, and quietly enjoying the friendship and society of the few scientific friends who still remained, for most of his intimates had long since passed away.

The titles of no fewer than eighty-four memoirs by Bunsen are given in the catalogue of the Royal Society up to the year 1883, whilst twenty more were published by him in conjunction with one or other of his pupils or friends.

In 1858 Bunsen was elected a Foreign Fellow; in 1860 the Copley Medal was awarded to him; and seventeen years later he, together with his colleague, Kirchhoff, became the recipients of the Davy Medal.

A memorial address by Dr. Curtius, the present Professor of Chemistry at Heidelberg, was delivered in the Aula of that University on November 11th last.

H. E. R.

Sir ALEXANDER ARMSTRONG, K.C.B., was of Irish parentage, his father being Mr. A. Armstrong, of Craham, co. Fermanagh. He was born 1818, educated at Trinity College, Dublin, and studied medicine at the University of Edinburgh. In 1842 he entered the Medical Department of the Navy, and in the course of his career saw a great deal of service in various parts of the world, becoming prominently identified with the survey of the "North-west Passage." The expedition to search for Sir John Franklin from Behring Straits eastwards, was fitted out in 1849, and Armstrong was appointed Surgeon and Naturalist to the "Investigator," under the command of Captain (afterwards Sir Robert) M'Clure. Four successive Arctic winters were passed by this expedition, before officers and men were finally transferred to the "North Star," and returned to England in the autumn of '54, while the "Investigator" was finally abandoned, a medical survey of the crew, ordered by M'Clure and conducted by Surgeons Armstrong and Domville, having proved the urgency of the step.

During the hardships of this eventful expedition, the first and last which succeeded in making the North-west Passage, Armstrong's efforts were happily directed towards preserving the ship's crew from scurvy, mainly by the liberal administration of lime-juice, and he was successful in keeping the scourge at bay until the spring of 1852. He was frequently mentioned in the despatches connected with this expedition, and at the time of his death was one of the very few surviving officers of the party who circumnavigated the continent of America.

The Russian war having broken out the year before the return of the expedition, Armstrong was ordered to service with the Baltic fleet. He was present at the bombardment of Sveaborg, and in two night attacks with a flotilla of rocket-boats, for which he was afterwards gazetted.

Later in his career he rose to the highest offices in the naval medical service. He was Deputy Inspector-General of the Mediterranean Fleet and the Naval Hospitals of Malta, Haslar, and Chatham, and was subsequently made Inspector-General for special services. In 1869 he was appointed Director-General of the Medical Department of the Navy, from which post he retired in 1880.

Armstrong published in 1857 his popular work, 'A Personal Narrative of the Discovery of the North-west Passage,' and he was also the author of a valuable book, 'Observations on Naval Hygiene, particularly in connection with Polar Service.' In 1857 he was elected a Fellow of the Royal Geographical Society, and in 1873 he became F.R.S. In 1871 he received his K.C.B., Military Division.

Sir Alexander married, in 1894, Charlotte, Lady King-Hall, widow of Admiral Sir William King-Hall.

M. F.

ROYAL ASIATIC SOCIETY
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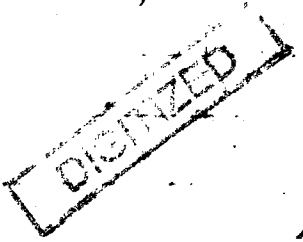

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